

Karlsberger

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Current Trends in Pediatric Hospital Design:

Are they right for your organization?

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Note from the Author



The building boom among children's hospitals is evident and has no end in sight. The strides made in treating common and uncommon childhood diseases, the related technological advances, the attention to patient safety, patient satisfaction, and family-centered care all are playing a role in the pressure to upgrade, expand, or replace pediatric healthcare facilities. Of *U.S. News and World Reports'* ranking of children's hospitals this year (2005), almost all of the top 25 facilities have recently expanded, are building, or are in the planning phases of a building project. The *Child*® magazine children's hospital rankings show a similar trend, with seven of the top 10 in new facilities or currently upgrading.

Despite such robust activity, most administrators and direct care providers involved in the facility design process do not have as much information about the possibilities and the trends as they would like. How a facility chooses to prioritize improvement opportunities often is dictated by a complex matrix of clinical, academic, financial, and political decisions, and is clearly influenced by the amount of information available to those participating in the planning and design process. This *Karlsberger Knowledge Paper* focuses on the opportunities available to today's projects that will shape tomorrow's patient, family, physician, and staff member experiences in inpatient facilities. Many of the opportunities presented are too new to have solid data-driven evidence related to cost, performance, or impact, but where available, I have included such information. I hope that you enjoy this *Karlsberger Knowledge Paper* and wish you success in your facility design pursuits.

A handwritten signature in black ink that reads "Juliet".

Juliet L. Rogers, PhD, MPH

Vice President, Healthcare Operations & Research

Author, *Karlsberger Knowledge Paper Series*



When project wish lists meet resource constraints

Every hospital wants to deliver the highest quality of care in the safest setting, and in an environment that supports the patients, the families, clinicians, and caregivers who work, live, and heal in that facility. Some hospitals go further with these goals and aspire to be “the employer of choice,” “the safest hospital,” or “the most wired hospital.” Regardless of your individual goals, you share the dilemma that all hospitals face – you must prioritize all the items on your list of possible, desired, and necessary improvements, communicate that prioritization, and choose those priorities to move forward and implement.

It is common today for hospitals to face pressures to renovate, upgrade, expand, and enhance facilities if they are to remain competitive in this increasingly consumer-driven industry. Hospitals are no longer competing for patients alone, but also must remain focused on recruitment and retention of frontline staff, allied health professionals, and the hardest-to-recruit nursing and medical professionals. Quality of care data and patient satisfaction scores are made public with widespread availability, creating pressure from payers, employers, and community members for accountability and vigilant attention to improvement metrics and quantifiable results.

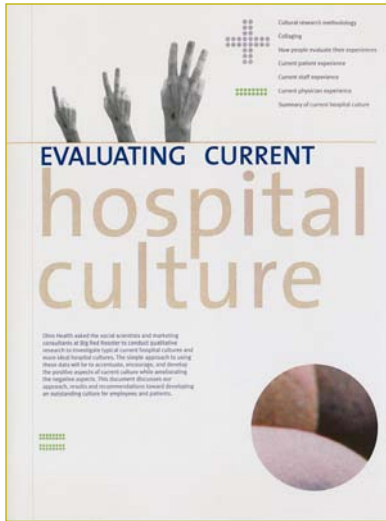
Traditionally, the most common questions that facility designers (planners, architects, interior designers) received from healthcare clients were focused on options for creating a more pleasing environment for patients and families. Most of these questions related to the patient room, family and play spaces, grand entrances, and welcoming lobbies. Today, those questions remain, but more commonly, clients not only are asking for, but are demanding, information related to the safest and most comfortable patient room options, the most productive nursing support configurations, the best technology integration plans, the latest communication options, and evidence-based options for creating the optimal healing environment for their patients and the healthiest, **most rejuvenating environment** for their employees.

Unfortunately, since it takes on average 5-7 years to plan, build, and activate a new hospital, the best designs currently are “on the boards,” meaning they are in planning or schematic design and won’t be open and functioning for several years. This reality forces hospital administrators and facility managers to choose between building facilities that mirror the best in existence today or to take risks, be the trailblazers, and create the hospitals of the future. Fortunately for tomorrow’s children, most hospitals are choosing the latter path.

The Top 10 Mistruths in Pediatric Facility Design

- 1) *There is no proof that design matters.*
- 2) *There is no such thing as too much family space.*
- 3) *We know our culture – and can’t change it.*
- 4) *If we build it, our staff will change.*
- 5) *We will be paperless and wireless by the time we open.*
- 6) *Acuity-adaptable rooms work for everyone.*
- 7) *Private rooms are the only option – for all of our units.*
- 8) *“Green” design is too expensive.*
- 9) *You’ll have to visit the healing garden for peace and quiet.*
- 10) *All we need to be ready for the future is shelled space.*





This path requires creativity balanced with discipline, idealism balanced with reality, intuition balanced with knowledge, and inspiration left unchecked. The following sections of this paper introduce the most common trends under consideration by children's hospitals embarking on or completing major facility upgrades, renovations, expansions, or total replacements, and provides information on the critical success factors related to today's options for tomorrow's hospitals.

Organizational inputs

The most successful projects (measured by the extent to which the finished product meets the stated goals and drivers) spend time in the beginning of the process identifying the cultural, functional, and physical barriers that will need to be overcome in order to achieve the desired success. This is best done through careful analyses of the following:

- **Organizational Culture:** The social norms and collective organizational expectations of those who work and live in the facility; the way the building feels.
- **The Functional Operation:** The clinical, educational and business functions and processes that take place in the facility; the way the building is organized into functions.
- **The Physical Layout:** The exterior and interior physical infrastructure, design, and construction; the way the building looks, operates and is maintained.



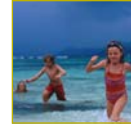
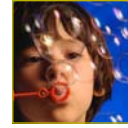
These analyses may be formal or informal, may be performed in-house or by outside consultants, and may be part of the official project or done separately. The important thing is that all three parts are given consideration, are discussed openly and without bias, and that participants are realistic about those factors that they can overcome and those that they cannot. A *Karlsberger Knowledge Paper*, written to guide project team members through this process, will be available in Spring 2006.

Separating fad from trend

Design teams today are bombarded with endless options related to configuration and aesthetics of **patient rooms**, nursing units, diagnostic and treatment areas, and public and outdoor spaces. The important thing is that you are able to decipher between what you need, what you want, and what you feel pressured to adopt. Not every design solution will be right for your hospital, your staff, or your patients.



St. Vincent Children's Hospital
Indianapolis, IN



As we review the five trends that we are seeing most commonly in facility design projects at children's hospitals, the hope is that we can begin to separate the trends into those that will be remembered as trends and those that will prove beneficial enough to become tomorrow's standards of care. The five overarching trends in today's children's hospital replacement or renovation projects are:

1. **Flexibility**
2. **Patient Safety**
3. **Optimal Healing Environment**
4. **Technology Integration**
5. **Security and Disaster Preparedness**

Designing for flexibility

The space within a hospital that has seen the greatest changes over the past decade is without question the patient room. With patients staying days instead of weeks, nursing ratios forcing less face time between the caregiver and the patient, and most parents opting to remain beside the child 24 hours per day, the patient room is facing new demands. Increasing the flexibility of these rooms is of paramount importance, and for many hospitals is key to maintaining occupancy rate goals and ensuring efficient patient throughput.

The transition from semi-private to **private patient rooms** is the most obvious way to increase bed flexibility and your occupancy rate. This will raise your patient satisfaction rates (semi-private patient rooms are the strongest driver of patient dissatisfaction), support HIPAA compliance, and may lower rates of hospital-acquired infections. There is also ample evidence that private rooms (in contrast to semi-private rooms) reduce noise, allow for higher-quality uninterrupted sleep, and ultimately result in lower average lengths of stay for some patients.

Private rooms also enable a more efficient and more comfortable arrangement through the creation of **three distinct zones** – the caregiver zone, the patient zone, and the family zone. Allowing for three distinct zones provides opportunities to focus on and enhance the experience for each zone's occupants by creating design elements that respond to the likely needs of each group. The patient zone may provide views of nature, room temperature and lighting controls that the patient can control, and direct and real-time access to media choices (music, TV, internet, video). The patient bed should be located in close proximity to the bathroom (proven to reduce falls) and at an angle that provides privacy from the public corridor. The caregiver zone must have a handwashing sink, a small area on which to set something or write, access to the workstation (if wired),

Project Drivers

Every facility project is likely to have several drivers of varying salience or importance. The ones listed here are the most commonly noted:

Projects that focus on ***Clinical Care and Patient Safety*** are driven by the desire to foster higher quality of care through improved clinical efficacy, efficiency, and productivity, and a reduction in errors in delivery of the right care to the right patient at the right time. These projects usually contain elements designed to increase multidisciplinary communication and collaboration, such as the integration of medical and nursing students, and inclusion of translational research opportunities.

Projects driven by an interest in increasing ***productivity*** tend to focus on creating capacity, and reducing access problems and bottlenecks. Facility redesign also offers opportunities to reduce inefficiencies inherent in older facilities such as communication problems, poor access to information, and other infrastructure issues.

Most projects expect to increase ***Marketing and Branding*** opportunities. Updating facilities, increasing amenities, and enhancing clinical service environments are necessary to remain competitive. Facilities that meet or exceed those offered by your competitors and are desired by your target market gives

(continued)



you a clear edge in recruiting staff and physicians and becoming the provider of choice for patients. For academic or research-rich institutions, facility upgrades or updates may be part of a national or international positioning strategy, designed to showcase your expertise in one or several clinical areas of excellence.

Future flexibility and life of the facility are big concerns to most healthcare institutions engaged in building projects today. The focus here is on balancing existing facilities and related maintenance costs with opportunities presented by renovation, expansion, or replacement projects. The ability to adapt your facility in response to changes in the delivery of care, new technologies, and the unforeseeable future is the main driver here.

Patient and family satisfaction are not only measured, but the results are available to patients, payers, and the general public for scrutiny and review. It has never been more important to please patients than it is now. Project elements that enhance the patient and family journey, from the moment they arrive until discharge (or completion of follow-up care), including generous spaces designed to support family-centered care within and outside of the child's room, family amenities, and parent accommodations are no longer optional enhancements, but are necessities in today's hospitals.

(continued)

and bedside supplies. The family zone usually includes sitting and sleeping spaces, internet access or laptop ports, and in some cases, a separate television in addition to the patient's television. Spaces that allow for personalization are increasingly popular, such as photo frames and displays, artwork, or special items from home. Overall, the desire to improve patient room conditions and technological capability is evident and the new standard for private pediatric patient rooms is a generous 340-400 sq. ft., up from about 150-180 sq. ft. just a decade ago.

In the 2006 version of the *AIA Guidelines for Design and Construction of Hospital and Health Care Facilities*, it is anticipated that there will be a private room mandate for the design of new or replacement facilities. This is applauded by many, but there is still a lively debate about the value and the challenges of private critical care rooms, especially for children. Moving to all-private NICU and PICU rooms requires new models for delivery of nursing care to the most vulnerable pediatric patients and may cause feelings of isolation for caregivers, patients, and families alike. Though initial increases in patient/family satisfaction appear to be significant, so does evidence of high (>30%) turnover among nursing staff that are used to working very closely together, consulting one another frequently, and assisting each other with patient alarms and care protocols. In the meantime, many children's hospitals are opting for models that are somewhere between private and pod arrangements, and may allow for conversion to private rooms at a later date. These models include pinwheel or 3-walled designs for NICUs, breakaway wall designs for PICUs, and circular unit designs with glass front panels that allow for maximum visualization of patients by nurses from decentralized or centralized nurses' stations. Probably the clearest difference between tomorrow's critical care units and those in existence today is the increase in dedicated space for families and the incorporation of principles of family-centered care on critical care units.

The arrangement of patient rooms or the **unit configuration** also is experiencing change based on research and the desire to improve both patient safety and efficiency. Decentralization of nursing units has transitioned from a process to a philosophy. Some hospitals are decentralizing nursing functions, such as supply management, monitoring, and nurse-to-nurse communication, to such an extent that they are not planning for nursing stations in their new facilities at all. Instead, they are moving to "team workspaces," defined as flexible spaces that any caregiver may use to complete paperwork, file documentation on line, respond to email, etc. These spaces are considerably smaller than yesterday's central nurses' stations, and several are located throughout the unit. The goal of the decentralized nursing model is to allow the nurse to remain in close proximity

to her or his patients and to reduce travel distances overall. To accomplish this, many hospitals are opting for “charting alcoves” that feature either a computer workstation or counter to use for online documentation, and offer windows into two adjacent patient rooms. Others have opted for in-room charting areas, located conveniently in the caregiver area or beside the patient’s bed. Both models usually incorporate some level of in-room supply management system.

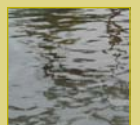
Those looking for the ultimate in flexibility often consider **universal beds**, designed to ensure that both critical care and general care beds are available as needed. Units comprised of this type of patient room are called **acuity-adaptable units**, and to date have not experienced widespread adoption in children’s hospitals. The idea is that each room features a flexible headwall that is critical care ready with redundant gases, monitors, and other equipment commonly found in ICUs, but that the room may be used as a general care or step-down bed as well. Appropriate staff moves to the patient, rather than transferring the patient from one unit to another, as his or her condition improves. This design option has had positive results, including increased patient satisfaction and a reduction in transfer-related work (HPPD), but they have been limited to adult hospitals and focused mostly on cardiac care. Those that have implemented acuity-adaptable units have demonstrated reductions in patient transfers, transfer-related expenses, and medical errors resulting from missed or delayed treatment, medication mix-ups, and poor staff communication. There is also ample evidence to suggest that patient falls are reduced when transfers are reduced. Implementation of universal beds requires large-scale hospital commitment to reorganize care (from the traditional model of acuity-based units) and obtain buy-in from nursing staff. Though there is evidence that acuity-adaptable units may aid in nurse recruitment or shortages, research shows that general care RNs like this model, while critical care RNs have been much less satisfied.

Despite the gains in flexibility demonstrated in the cardiac care units and the birthing centers that have adopted the universal patient room and the LDRP (labor, delivery, recovery, and postpartum) models, acuity-adaptable units are not right for every hospital. Due to the cost of equipping all rooms for ICU capability, these upgrades are most appropriate in hospitals building new patient rooms and tend to be cost prohibitive for those renovating existing facilities. The model also may not be applicable to hospitals with high-acuity, highly specialized service lines where cross-training of nursing staff likely is not appropriate. Furthermore, it is unlikely that these models will experience widespread adoption by top-tier children’s hospitals with academic medical center affiliations and highly specialized clinical protocols.

Recruiting, retaining, and satisfying the **Medical and Nursing staff members** requires a focus on project elements that offer respite (off-stage) areas designed for collaboration and group interaction, teaching and training spaces, services, and amenities designed to serve your employees.

Of course, **Cost savings and cost avoidance** are two strong drivers of most facility projects. The focus is on projects that will result in cost savings through avoidance of costs related to maintenance and repairs to aging facilities, or through gains in energy efficiency and ultimately lower utility expenses.

Each of the drivers above impact most children’s hospital projects in one way or another. The extent that one motivates your team more than another is important, and all facility projects should begin with clear articulation of what is driving the project, which may differ among the key players on the team. 🌿



Designing for patient safety

A great deal of innovation has taken place in the patient room and hospital-wide related to the integration of technology for the purpose of reducing medical errors. A recent Hospitals & Health Networks / American Hospital Association survey of the 100 “most wired” hospitals in the United States showed that the overall patient mortality rate at “wired” hospitals is 7.2% lower than the rate at those hospitals that did not make the list. Though the direct correlation was reportedly unknown at this point, the study created a buzz by announcing a clear distinction between those hospitals that have made the significant upfront investment in an integrated approach to IT and those who have not enjoyed such widespread adoption. In the patient room, the early integration of technology at the bedside consisted of **bar coded** patient identification bracelets that can be scanned to ensure matches with personalized, automated medication, lab, and equipment bar code labels that are brought to the patient.

Today, the move toward RFID (**Radio Frequency Identification**) is beginning, allowing hospitals to track the status and exact location of patients, staff, and essential equipment. RFID tags are used that can be detected by tag readers throughout the facility, from a distance of up to 600 feet. Hospitals to date have used RFID mostly for the purposes of tracking supply and equipment inventory, but use of the tags for medication and patients is increasing.

The most commonly used technologies designed to impact clinical care and reduce medical errors are CPOE (**Computerized Physician Order Entry**) systems and EMRs (**Electronic Medical Records**).

The most successfully “wired” hospitals will use these together and will integrate the systems so that they also talk to the billing system and other key computerized systems. EMR and CPOE have been proven to improve clinician workflow, reduce errors, and increase revenues through reduction in billing delays. Together with handheld and wireless digital assistants, EMR and CPOE allow physicians and nurses to have access to the most current hospital data regardless of whether they are at the patient’s bedside or driving in their car and consulting by telephone. Other developments bringing caregivers closer to the patient are portable point-of-care testing like blood gas monitoring and portable diagnostics like imaging using handheld devices. Integrated hospitals record results from these tests, automatically upload them to the EMR, and they are available in real-time to physicians and nurses **via handheld tablets** and personal digital assistants. This is the way of the future and those hospitals that resist integrating technologies that improve information flow and, ultimately, patient safety, will find themselves needing to catch up which will prove costly in the long run.



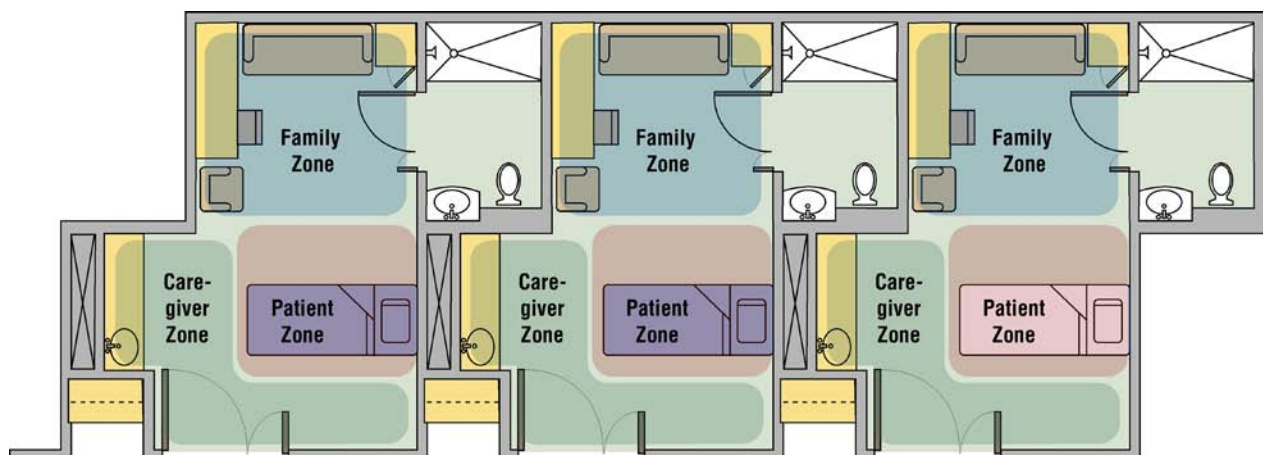
Proposed Private NICU,
Dell Children’s Medical Center
of Central Texas
Austin, TX

Ending the paper chase through adoption of these technologies results in nurses having more time to spend on patient care. The use of **handheld or portable devices** for charting and nursing notes has resulted in the ability to design units devoid of traditional, centralized nursing stations. Nurses no longer need a central place to make phone calls when they can use a handheld, wireless device to speak with patients' families or communicate directly with a patient with a walkie-talkie-style device. This eliminates overhead noise from paging or locators and allows the patient-enhanced privacy (versus having to push a nurse call button that is answered on a speakerphone which broadcasts the patient's request to anyone nearby the central nurses' station). **Decentralized workstations** are receiving praise from nurses who no longer need to walk long distances for supplies or phone and computer access, and can communicate directly with one another.



The Children's Hospital of Philadelphia
Philadelphia, PA

Without question, one of today's most publicized recommendations related to designing for patient safety is the **standardized, same-handed, identical patient room**. This option differs from the traditional mirror-image rooms that rely on a single plumbing stack serving two adjacent patient rooms which results in shared wall headwalls. Complete standardization of patient rooms implies that the placement of the patient, the furniture and equipment, and the location of supplies are completely standardized, down to the contents of each drawer of the supply cabinet. Based on human factor errors literature citing research done for manufacturing productivity studies, the idea here is that repetition and reduction of variation reduces



errors. If Tylenol is always located in the top right bin in the cabinet and you always reach to the top right bin to get it, regardless of which cabinet or which room you are in, you will be less likely to choose the wrong medication as you would be if there was no standardization. With each level of standardization – location of cabinet, location of bin, location of medication within the bin – the likelihood that you will mistakenly choose the wrong medication is reduced.



There is still relatively little data from children's hospitals to support the assertion that identical rooms reduce medical errors, but this is due more to the lack of units in operation today than to the strength of the research efforts. Both health services researchers and healthcare designers alike agree that once this layout option experiences widespread adoption and research can be generated with larger sample sizes and an array of different acuity levels and hospital types, there will be significant proof that this design element not only matters to patient safety outcomes, but significantly and directly impacts it.

Technology integration

Many of the advances in the integration of technology into the patient room are highlighted in the previous sections, so I will refrain from repeating those options here. In the simplest terms, the age of the **Digital Hospital** is here and now, and with it, the digital divide. Those "early integrators" are up and running and already moving on to the next big thing while the vast majority of hospitals and health systems are still contemplating whether the time is right

to make the gargantuan investment to move to a totally integrated, digital, wireless, and paperless hospital. This investment not only is financial, but is cultural as well. Digital hospitals operate differently than their less technologically sophisticated peers. They turn to technology to solve new problems, adapt technology to solve old ones, and offer technological amenities to staff and patients alike. In many parts of this country, patients and visitors expect a wireless



Proposed Main Entry, Dell Children's Medical Center of Central Texas
Austin, TX

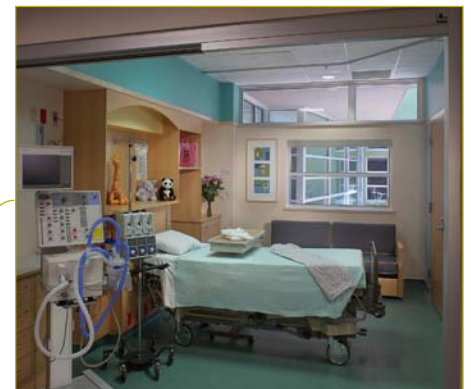
environment when they enter a hospital, where they can **check their email, receive instant messages on their handheld devices**, and post pictures of their just-born infants. Meanwhile, other hospitals contemplate how they might be able to designate a computer or two for family use. Overall, it is estimated that 60% of hospitals are working toward digital environments. The remaining 40% do not have the resources and are not intending to adopt a digital environment any time soon.



Regardless of which description fits your hospital, it is critical to realize that every facility project, big or small, presents opportunities for technological integration and upgrades. The key here is that facility leaders and design teams focus on what they want the environment to be and not dwell on what it is right now. Halfway solutions never work – if you are designing a new unit and hope to have an EMR by the time it opens, do not build chart holders and other supports for paper medical records systems “just in case.” If you build in the option of not adopting the new process, people will have little incentive to change.

Communication among staff and between staff and patients is one area that is ripe with plentiful new options. I mentioned above the option of using wireless handheld phones or walkie-talkie style devices for nurse communication, but many of today’s handhelds go beyond the phone capabilities. Several on the market today can communicate with patient monitoring systems and display the information on the handheld device for portable monitoring. Others can be set to receive synchronized alarm signals from patient equipment. For those nurses who don’t want to have to carry something in their hand, some are small enough to wear around the neck or clip to a pocket.

For those that worry about the decentralization of nursing care and its potential effect on the ability to monitor patients centrally, some hospitals have adopted “e-ICUs” that provide **remote monitoring** of ICU patients via cameras and screens displaying vital signs, diagnosis, progress, and doctors’ notes, by nurses and physicians located in a room of monitors on- or off-site. e-ICUs are not meant to serve as substitutes for direct caregivers, but instead offer the support of another set of eyes. The e-ICU is enabled with the ability for two-way communication, to respond to patient needs and ask questions of the patient, then making the determination of whether the direct care nurse needs to be pulled away from what she is doing to attend to this patient immediately. Early reports indicate that patients and caregivers alike are very satisfied with this extra layer of attention.



Phoenix Children’s Hospital
Phoenix, AZ

Probably the most important development in healthcare technology



is the one that we haven't seen yet. The importance of **shelled spaces** or "soft" spaces that can be converted in the future to accommodate new equipment or systems is paramount. Though these types of spaces may add costs to the project initially, the savings that are generated down the road are significant.

Healing environments

The evidence supporting the premise that design matters is beginning to revolutionize the healthcare environment for everyone who sets foot in a hospital. Many design elements impacting the patient room were presented above, while others are presented here. Together they demonstrate that healing environments are no longer found only at the finest spas and luxury, VIP hospital suites. The relationship between the healing environment and patient outcomes, staff productivity, and everyone's satisfaction is documented with each new Pebble Project. The Pebble Project (a Center for Health Design initiative) partners with hospitals implementing and studying evidence-based design, by promoting research on healing and environment in the areas of social support, positive distraction, integration and recognition of nature, and patient control. Pebble Project partners share information with one another and publish their results that link patient, staff, and financial outcomes with design decisions.



St. Vincent Children's Hospital
Indianapolis, IN

Tomorrow's optimal patient care

environments will be operationally and aesthetically balanced, family-centered, and will provide **positive distractions** such as water features, soothing music, pleasant smells, and access to art and to indoor and outdoor healing gardens. All of these are linked to shorter lengths of stay, elevated mood, higher patient satisfaction, and increased quality of life for hospital patients. Choosing materials that contribute to **noise reduction** has demonstrated similar results, as well as additional effects such as lowering elevated blood pressure and contributing to better rest. **Natural light** is also key to creating an



optimal healing environment, as bringing **natural light** into a building has been shown to result in higher productivity, better overall health, lower absenteeism, and increased job satisfaction for hospital staff.

Even more important than adoption of select design elements is an overall approach to increasing the **patient's control of his or her environment** – the temperature, the lights, the views, interactions with caregivers and visitors, excess noise, music, TV, and media options. Though the smallest pediatric patients may not be able to express their preferences, having these control options available to parents proves as effective in the overall goal of creating the most comfortable environment possible for each patient.

Hospitals continue to learn from the customer service excellence found in leading hospitality chains. Amenity-rich lobbies and public spaces are rapidly becoming standard features in new hospital construction, including hotel-style registration desks, concierge-style customer service representatives and navigation assistants, education and community gathering space, resource centers featuring libraries, networking and business necessities, and quiet places for respite.

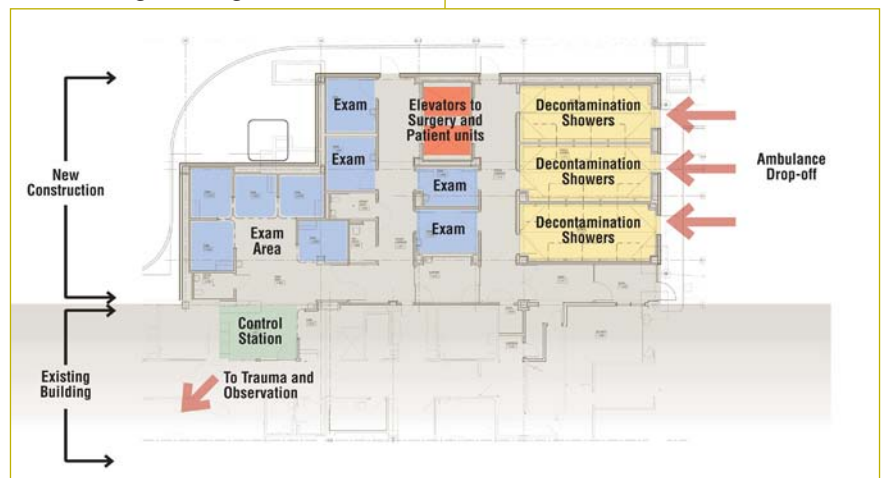
The literature is rich with case studies of how hospitals historically and recently have completed projects integrating healing design into their facility plans. Selected articles and websites documenting the research on healing environments are listed at the end of this paper. For a catalog of photographs and descriptions of healing environments created by Karlsberger and our partner hospitals, please contact us.



**Proposed Atrium,
Dublin Methodist Hospital**
Dublin, OH

Security and disaster preparedness

The level of **disaster preparedness** and mass-casualty readiness a hospital must achieve is very dependent upon the risks faced within the immediate hospital, surrounding community, and region as a whole. Children's hospitals in urban settings or large, academic referral centers must invest heavily in creating a culture of readiness and a response plan for any disaster, natural or otherwise, that they may encounter. Despite the heavy publicity of the need for this high level of preparation, most children's hospitals are more concerned about **everyday security**, and rightfully so. Though the extent of possible devastation is not right for comparison, it is fair to say that the likelihood of a children's hospital having to deal





with an infant abduction or workplace violence situation is far greater than the likelihood of a terrorist attack directed at their building. Thus, most children's hospital's are electing to invest in basic mass casualty equipment (hazmat suits, decontamination areas, isolated showers) and develop sophisticated everyday security processes using a combination of staffing solutions, technological security enhancements, and educational outreach to patients, visitors, and staff regarding personal, hospital campus, and community safety. Spending an adequate amount of time researching available programs for visitor identification, badging, and tracking, and significant dollars on infant protection systems with proximity alarms has proven worthwhile for most large children's hospitals. Institutions building new or replacement facilities also have the option of designing the facility with an orientation that creates a safer environment – requiring key cards for access to diagnostic and treatment areas or patient units; limiting non-essential traffic to public areas, positioning concierge and customer service desks with visual access to elevators and key corridors; separating public traffic from hospital personnel, equipment, and patient traffic; and locking down elevators and stairwells in the evenings and through the night. Alert, aware, and conscientious employees are the best security system any hospital can implement.

Reconsideration of **elevator usage** in disasters is a new debate that most definitely could have a significant impact on hospital design. A report from the National Institute of Standards and Technology, charged with investigating building safety codes following the September 11, 2001, World Trade Center (WTC) attacks, raise questions about our long-standing avoidance of elevator use during

fires or disasters. The report indicates that nearly 3,000 occupants were able to evacuate WTC 2 because they used elevators in the 16 minutes before the second tower was struck. Overall, the rate of evacuation in WTC 2 was 108 survivors per minute, versus 73 survivors per minute in WTC 1, which was not using elevators. This discrepancy would be even greater in hospital environments, where using stairwells to evacuate non-ambulatory patients often requires multiple caregivers per patient and in the worst cases, results in providers faced with the awful decision to evacuate the healthiest and abandon those with little or no chance of surviving the evacuation.



Take a new look

This *Karlsberger Knowledge Paper* is not intended to serve as a comprehensive review of the information available related to designing tomorrow's children's hospitals. Instead, it is intended to assist hospital leaders in defining those general, overarching areas that are worth spending significant amounts of time on in the project definition stages of the design process. For each of these trends, there are few built examples, but many examples "on the boards" and in construction. The important point in all of this is that the distinction between a fad and trend is completely dependent on what you hope your project will achieve. Each institutional leadership team must weigh whether or not these trends are right for them – Will this work with our culture? With our patients? With our staff and physicians? Is this the right model for us? Perhaps your idea has not been proposed yet and you are creating tomorrow's trend right now.

Developing and following guiding principles for your children's hospital project, revisiting your project ideas and facility needs, and prioritizing the available options, will help to keep all pending needs on the table. Creating a master plan that demonstrates operational responsiveness and facility vision will allow you to implement the best solutions for you over the long term, while achieving balance between the financial investments required and the expected short and long-term returns.

Recommended Reading

“The Role of the Physical Environment in the Hospital of the 21st Century: A Once-in-a-Lifetime Opportunity,” A report by Ulrich R, Zimring C and colleagues to The Center for Health Design for the Designing the 21st Century Hospital Project. September 2004.

“Putting Patient Safety in the Blueprint,” by Larson L. *Hospitals & Health Networks*, Volume 77, No. 2, February 2003.

Putting Patients First: Designing and Practicing Patient-Centered Care, Frampton S (Editor), Gilpin L (Editor), Charmel P (Editor), April 2003, Jossey-Bass.

“The business case for better buildings”, by Berry LL, Parker D, Coile RC Jr, Hamilton DK, O’Neill DD, Sadler BL. *Frontiers of Health Services Management*. Volume 21, No. 1, pp. 3-24, Fall 2004.

Organizations & Websites

Center for Health Design
1850 Gateway Blvd, Suite 1083, Concord, California 94520
Phone: 925-521-9404
www.healthdesign.org

Institute for Family-Centered Care
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About Karlsberger

Karlsberger Companies is a nationally recognized healthcare planning and design firm that specializes in the development of children's healthcare spaces. Celebrating 77 years of architectural excellence, the firm has worked with more than 68 children's hospitals, more than any other firm in the world. This extensive experience with freestanding children's hospitals as well as those that are part of a larger, healthcare facility, provides Karlsberger the knowledge required to successfully solve similar issues, differently and specifically for each client. The firm embraces cultural, geographical and operational differences among their pediatric healthcare clients and applies this knowledge to all.

Serving as a contributing author, Karlsberger's work is profiled in "Designing The World's Best Children's Hospitals," a book published in 1999, which portrays the finest pediatric facilities in the world. A second edition, "Children's Hospitals — the Future of Healing Environments," was just published in July of 2005 and Karlsberger is once again a contributing author.

Karlsberger is a Platinum Partner of the National Association for Children's Hospitals and Related Institutions (NACHRI) and has supported the association for over 25 years. Members of the firm frequently write articles and present lectures to a variety of healthcare and design organizations regarding pediatric planning and design issues.

The firm has been in continuous operation since 1928 and provides full service professional research, planning and architecture services to the healthcare industry. Headquartered in Columbus, Ohio, with over 170 total staff, the firm also has offices in New York City, Birmingham, Alabama, and Ann Arbor, Michigan.



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