

ISHE ISSUES



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KING'S DAUGHTERS' HEALTH

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From its humble beginnings in a single family home donated in 1899, King's Daughters' Health, which is owned by The Bethany Circle of the King's Daughters and Sons, has expanded to become a regional healthcare provider with physician offices in five counties in southeast Indiana and Kentucky. The former hospital campus, which opened in 1915, saw many expansions and renovations in its urban, main-street setting, but was no longer able to support the necessary growth required in order for King's Daughters' Health to provide patients with necessary privacy and comfort and implement new technology.



Site Entry

Thus, Artekna's design team and King's Daughters' Health embarked on a journey to design a campus that would provide patients with state-of-the-art technology and to facilitate Bethany Circle's mission to deliver exceptional health services. In February of this year, this journey culminated in the grand opening of the new \$100 million green field replacement hospital and Community and Medical Arts Center (CMAC) in Madison, Indiana.

Main Hospital Entry



Main Entry Lobby

The new facility emphasizes patient-focused strategies, on-stage vs. off-stage concepts, the healing qualities of natural light, efficient space layouts and travel distance considerations. It was constructed on a portion of the hospital's new 96-acre campus, and includes dedicated areas of future expansion opportunities. A fast-track construction delivery method was utilized that included six separate design and drawing bid packages.

The facility is comprised of two interconnected buildings. One building is the 212,000 square foot hospital that houses 86 all-private, same handed patient rooms. Adjacent to the hospital is the 95,000 square foot CMAC, home to physician office suites. Many traditionally non-acute care hospital functions were also located in the economical CMAC structure. These functions include the hospital main entry and lobby, Registration, Gift Shop, Human Resources, Dietary, Administration and Materials Management. These strategies allowed the entire facility to be built for approximately \$248 per square foot construction costs. In fact, the building was completed for \$1.6 million below the guaranteed maximum price.

The design was formulated through dozens of meetings with department heads, physicians and staff, and was augmented by the master site and facilities planning process completed in 2006 by Artekna. The new hospital design also incorporated oversight and senior-level hospital input via the Replacement

Hospital Steering Committee comprised of physicians, hospital administrators and the design team. The Steering Committee developed the following Guiding Principles for the project:

- Design decisions must be based on what is most beneficial for the patient;
- The project must be a good steward of KDH finances and resources;
- Create clear separation of “on-stage” / “off-stage” activities;
- Maximize opportunities for natural light to enhance patient healing and staff/visitor well-being;
- Minimize travel distances for patients, staff and visitors;
- Develop efficient space layouts that enhance KDH processes;
- Maximize/facilitate the use of technology for patient care and staff flexibility.

These principles, as well as other evidence-based design practices, Lean process improvement and waste reduction strategies, and new operational approaches, manifested in the design in many ways:

Research-inspired and collaboratively-designed nursing pods were created that represent a hybrid between centralized and decentralized care concepts. The project team, in coordination and collaboration with the various nursing groups, looked at many options for the nurse stations on the patient floors, from total centralization to total decentralization and various concepts in between. The general consensus was that a single nurse station on each floor was too far removed from the patients and required too many steps for the caregivers. Conversely, the potential isolation of a decentralized system with an individual station outside of each room did not mesh with the culture at KDH. Therefore, the design is a hybrid of both concepts. It has the benefits of keeping the nurses closer to their patients, but still provides social and



Typical Nurse Station

collaboration space. There is one nursing “pod” for every six rooms. Each pod was designed with three distinct zones: a stand-up zone for quick exchanges, a work zone for charting and other activities, and a private zone shared by several pods for collaboration, consults and dictation. Each nursing area is connected to other nursing areas via staff-only “passageways” to help foster collaboration and to minimize feelings of isolation. Because dictation and many of the nursing conversations take place in the enclosed private zones, the patient floors and nursing pods are very quiet, which is a benefit for patient healing.

In order to increase efficiency and maximize usage, a flexible patient prep and holding unit was created for surgery and outpatient services. Surgery patients, endoscopy patients, cardiac cath patients, cystoscopy patients, dialysis and other specialties utilize a zoned, yet shared, collection of 24 pre/post operative rooms, which allow room utilization to flex throughout the day based upon which procedural rooms are generating patient traffic. This concept saves square footage by reducing duplication of support spaces, especially when utilization can vary over the course of the day or week.

The hospital has 86 private, same-handed patient rooms that were designed to emphasize care, healing and safety. Headwalls are oriented towards the large exterior windows to maximize patient views to the outside while still providing patient visibility for the nursing staff. In order to mitigate fall risks, the door to the toilet room is located on the headwall just a few feet from the patient’s bed. A handrail on the headwall provides an opportunity for support during the short



Patient Room

trip to the bathroom. The location of the toilet room and the handrail were specific responses to concerns raised during the research and planning phases. A full-scale finished mockup of the patient room and toilet room were constructed to study the various concepts discussed during design. The mock-up was toured by physicians, nurses, staff and community members for input. Many improvements were made to the rooms based on these sessions, including a revision to the layout of the fixtures in the toilet rooms to provide a continuation of support to reach the toilet. Each patient room also provides separate family areas and caregiver zones, allowing the families to be integrated into the delivery of care. The sink is located near the door and the caregiver work area has a solid surface countertop for infection control purposes.

Comfort and privacy for staff and patients are enhanced on each floor of the hospital utilizing on-stage and off-stage concepts. The on-stage areas include the lobby, registration, waiting, dining, gift shop, chapel and other visitor areas. The off-stage areas include patient cart traffic, dietary traffic, surgery, OB, housekeeping, IT, plant operations and other hospital functions. Access to the off-stage areas is through secure access points. Each floor of the hospital contains both horizontal and vertical off-stage circulation to connect the various functions.

As one of the most utilized areas of the hospital, the Outpatient Center is located near the hospital entrance adjacent to the main public elevators and lobby area. This area enjoyed significant process improvement study as the entire pre-admissions testing, registration,



Patient Room



and outpatient services were reviewed and reworked from the hospital's previous process. Also, in order to avoid redundant space utilization and staffing, the outpatient area has a back door connection to the adjacent hospital Radiology Department and Cardiac Services Department. This access configuration saved the hospital the cost of re-creating an X-Ray Room and cardiac testing areas in the Outpatient Department.

The Emergency Department is zoned by acuity from the Trauma Rooms down to a dedicated Fast-track area. The ED also includes a four-bed observation unit that can flex between cardiac observation and patient holding, if necessary, until a patient room becomes available.

An enclosed courtyard, which provides the required separation between the hospital and CMAC, also allows natural light to reach otherwise inboard areas of both buildings. The courtyard also provides an outdoor dining area for the adjacent dining room, and serves as an anchor for public wayfinding. The public elevators on each floor of the hospital open to full height windows that overlook the courtyard. The Guest Seating areas on the third and fourth floor also take advantage of natural lighting. These areas are surrounded by floor-to-ceiling glass on three sides, which provides great views and an inviting atmosphere.

The chapel is located in the heart of the hospital between the inpatient and outpatient areas. An existing stained glass window was relocated from the former chapel and serves as a focal element of the new chapel space. The hospital has completed a serenity garden located just outside of the new chapel and is visible



through the glazed curtain wall system. The garden serves as an extension of the chapel, and provides a healing, meditative space.

The physician offices in the CMAC were designed around a standard clinic module that was developed as part of the design process. This model provides flexibility for both physicians and KDH as evidenced by the several instances of physician groups added and relocated during the construction phase. With an eye towards the future and increased opportunities for wellness and preventative medicine, the office building can expand to double the current square footage.



Physician Office Reception and Registration

All three main public entrances (ED, hospital, and physician offices) are located on the same side of the facility. This helps mitigate visitor/patient confusion as each entrance is clearly visible upon entering the site allowing easy navigation to the desired entry point.

Energy conservation was also an important consideration for this facility. The exterior wall system utilizes an entirely continuous insulation methodology and low-E insulated glazing at all window locations. However, the most interesting conservation piece may be the chilled water system. This energy efficient system includes a 425 ton centrifugal chiller and a 425 modular heat recovery chiller. The heat recovery chiller takes the heat removed through the chilling process and rejects the heat to the heating water system and the domestic hot water system. Conventional systems reject heat from the chilling process to the outside through cooling towers. Additionally, by including a variable frequency drive on the centrifugal



Typical Physician Office Suite Entry

chiller, a variable-primary pumping arrangement was implemented to further reduce energy consumption.

True to Bethany Circle's mission, the new hospital incorporates evidence-based design practices and process improvement studies to facilitate exceptional health services. From the private, same-handed patient rooms to the separation of on-stage and off-stage activities, to the improved efficiency in navigation through the building to locate both physician and hospital services, as well as the use of natural light, the Guiding Principles served as a road map for the development of the facility to allow the hospital and Bethany Circle to continue the caring tradition of the founding members.

Project Design Team:

Architect - Artekena Design, Office of Architecture, P.C.

Construction Manager - Wehr Constructors, Inc.

Civil Design and Engineering - FPBH, Inc.

Structural Design and Engineering - Lynch, Harrison & Brumleve, Inc.

MEP Design and Engineering - KJWW Engineering Consultants

Interior Design - bohemedesign and JMS Design

Kitchen Equipment Planning - Reitano Design Group

Medical Equipment Planning - The Centre for Health Care Planning

Landscape Design - Enviroscape