



**EDAC Champion and Advocate Firm Projects**  
**EVIDENCE-BASED DESIGN**  
**IN PRACTICE**  
**2018**

Evidence-based design (EBD) is the process of basing decisions about the built environment on credible research to achieve the best possible outcomes. EDAC Champion and Advocate Firms take an additional step, ensuring their healthcare teams become EDAC certified and actively incorporate EBD in their healthcare projects. Each of the projects highlighted in the EDAC Advocate Brochure describe how the evidence-based design process was applied to address challenges in their projects.

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To become an Advocate Firm, contact [edac@healthdesign.org](mailto:edac@healthdesign.org)

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Evidence-based Design Accreditation and Certification (EDAC) assesses your knowledge of the evidence-based design (EBD) process and its application in the design and development of healthcare environments. This educational program teaches you how to find, use and create relevant research to improve healthcare outcomes and add to the knowledge base of EBD.

Since its launch in 2009, more than 2,300 individuals worldwide have obtained the EDAC credential. Currently, 61 industry organizations endorse the program. Champion Firms participated in the beta testing phase and were the first to commit staff to take the exam. Advocate Firms dedicate a minimum of 25% of their healthcare teams to become EDAC certified.

### The evidence-based design process includes eight steps:

- 1 Define EBD Goals & Objectives
- 2 Find Sources for Relevant Evidence
- 3 Critically Interpret Relevant Evidence
- 4 Create & Innovate EBD Concepts
- 5 Develop a Hypothesis
- 6 Collect Baseline Performance Measures
- 7 Monitor Design & Construction
- 8 Measure Post Occupancy Results

### The EDAC program offers educational resources including:

- EDAC Study Guides (1-3)
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- Knowledge Repository, a one-stop, complete source of EBD research



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# HKS

## ProMedica Health and Wellness Center Sylvania, OH



PHWC Lobby, HKS Inc.  
/Scott Withers, April 2016

### Goal

The ProMedica Health and Wellness Center exemplifies how research, Lean processes, and thoughtful design can help a health system prepare for the future in the ever-changing healthcare environment. The goals for the project were to: 1) develop a building that supports a collaborative care model for primary and specialty practices; 2) identify space savings and construction cost savings through shared resources; 3) create opportunities to increase exam room utilization and flexibility for future growth; 4) increase collaboration between providers; and 5) enhance the patient and staff experience.

### EBD STEPS APPLIED:



**Overview:** The 230,000 square-foot ProMedica Health and Wellness Center brings together 11 system physician practices into a one-stop center for patients, enhancing clinical collaboration and creating a holistic approach to healthcare. Connectivity, flexibility, and sense of place make this building the catalyst for a change-ready wellness network. The exterior landscape extends from the street to interior courtyards, providing four-season connections to nature and daylight. Architectural form, material, and light resonate with the contextual and cultural influences of the region for a distinctive vocabulary expressing both the client's brand and a unique personality of place—well-connected to the community, nature, and the processes within.

**Challenge:** Improving the patient and staff experience was paramount. In combining 11 physician practices under one roof, the team was challenged to provide an efficient use of space, leveraging common building support elements and creating a standard platform for primary and specialty clinics.

**Solution:** The biggest challenge to flexibility in the existing clinics was the decentralization of services without standardization. This caused both

variability in workflow and challenges in load leveling. The team responded by integrating workplace strategies to promote productivity, collaboration, and wellness: Clinics are now organized into standard modules that are interconnected. The standardization of rooms and the connectivity between clinic modules allow for flexibility within the clinic space, making schedule load leveling seamless.

A pair of three-story courtyards, both open to the elements, flood the visitor gallery with natural light and provide access to nature, a theme repeated throughout the patient journey through the building. As visitors enter the building, the south courtyard is part of the three-story atrium where check-in, registration, and a café are located. In every clinic module, all the internal corridors align with exterior windows, and on their return journey, patients are able to see the courtyard light coming through the translucent clinic entry doors. This provides a consistent design language of connectivity to the outside world, as well as an intuitive wayfinding strategy for the building.

### Results:

Research was conducted in the existing clinics, followed by a post-occupancy study of the new building. In addition to conducting onsite observations and interviews, researchers used parametric modeling tools for off-site spatial analysis. Reported data (archival/interviews), observed data (shadows/behavior maps), and spatial data (proximity analysis) were analyzed together to identify patterns to develop the HKS Idea Fellowship Report "Re-thinking the Clinic: Optimizing the Outpatient Environment." This report provides a better understanding of the physical environment's impact on productivity and throughput, as well as the relationship between facility design, human experience, and organizational efficiency in the outpatient setting.

By consolidating separate clinics into one multi-specialty building, total square footage was reduced by 6% compared with existing spaces, saving the system approximately \$641,000 in construction costs. The clinics allow for staff and service flexing through a centralized spine. Workflow optimization, along with the co-location of work areas and support spaces, reduced the overall walking distance of medical assistants by 36% and regulated walking distance between clinical teams by 91%.

The clinic modules are standardized and connected, allowing for flexibility and future growth. ProMedica has the opportunity to increase overall utilization from 47% to 80% within the same physical space simply by leveraging the current schedule and future staff additions. The team noted an increase in same-day and scheduled referrals, and the use of ancillary departments such as Imaging, Lab, and Pharmacy. The building now serves as a one-stop shop for patients' health and wellness needs. Moreover, the patient and staff experience was improved by providing access to natural light and views to nature through the internal courtyards, light-filled staff corridors, onsite amenities (including a gym, a café, and a planned roof garden), staff lounges, and conference/education spaces available in each module.

EBD STEPS APPLIED:



**Overview:** West Springs Hospital is a new replacement facility consisting of a 48-bed inpatient psychiatric hospital on the Mind Springs Health campus in Grand Junction, Colorado. Future plans include 16 additional beds, for a total of 64. Of the three (later four) units in the facility, one will provide specialized care and treatment for children and adolescents. The project also includes three separate entries (one for the general public, another for crisis and urgent needs, and a third providing secure entry for hospital staff); an art room; a gym; ample outdoor space within interior courtyards; therapy and quiet rooms; areas for visiting family members; and support spaces for both patients and staff.

**Goal**  
The primary goal of the project is to “Build Sanctuary” by creating a welcoming, comfortable environment that provides a sense of dignity and safety for both patients and staff. To this end, the design team worked to cultivate an atmosphere that supports healing without feeling institutional, helping patients remain at ease and open to receiving treatment.

**Challenge:** The biggest challenge was creating a space that meets stringent safety requirements while, at the same time, providing a welcoming environment where patients can maintain their dignity and humanity. Careful consideration was given to simple, everyday features such as light fixtures, glazing, furniture, and toilet accessories, as any of these items could be used by patients to harm themselves, staff members, or other patients. Striking a balance between the two extremes of safety and comfort—and, more specifically, incorporating durable design elements that are behavioral health-appropriate without generating an overly institutional atmosphere—became the major focal point for both the team’s research and design efforts.

**Solution:** To create a welcoming environment while prioritizing safety, the project began with an intensive design process. An extensive, cross-disciplinary literature review was undertaken first to identify the challenges of inpatient behavioral health design and to evaluate high-impact design strategies throughout the facility. For example, lighting, color, and artwork were analyzed for their effects—whether calming or agitating—on the patient population.

The design team included a behavioral health expert who offered guidance and consultation to the client, and behavioral health peer groups were included in design meetings to provide the patient perspective. In the Design Development phase, Lean rapid prototyping exercises helped to better define the owner’s priorities, concerns, and workflows. And while the input of the behavioral

# Davis Partnership Architects

West Springs Hospital  
Grand Junction, Colorado



Main: West Springs Hospital Family Waiting Room  
Davis Partnership Architects  
Small: West Springs Hospital Patient Courtyard

health consultant was instrumental in ensuring the safety and success of both the product and design strategies, the team also capitalized on the extensive experience of our design and ownership teams. The hospital’s facilities team in particular provided crucial insights on the durability of certain products and the effects of design decisions on patients and staff.

**Results:** Based on both collaboration with the owner and the preliminary literature review, it was determined that nature’s impact on the healing process cannot be overstated. However, the varying methods used to incorporate nature into the behavioral health environment impacts patients differently. For instance, when it comes to artwork, abstract or out-of-scale images should be avoided as they can trigger confusion or anxiety in patients. Research indicated that properly scaled, clear nature images help to ground patients in their surroundings.

Furthermore, because views of nature and daylight have been shown to support healing and reduce stress, the project includes generous amounts of glazing. There is some concern, however, about the durability and safety of the glazing, as well as the risk of overheating. Next steps will include mock-ups of various glazing products to ascertain the safety and comfort of the available options.

In addition to the glazing, specific final product details will be reviewed for safety purposes. These include finishes, door hardware, bathroom fixtures, and accessories used in high-acuity areas where patients may be unsupervised. After occupancy, data on patient critical incidents will be analyzed to compare frequency, duration, and intensity between the existing and new facilities.

### EBD STEPS APPLIED:



**Overview:** The University of Wisconsin Cancer Center, a new three-level facility, houses a regional cancer center, multi-specialty ambulatory clinics, and an array of diagnostic and treatment programs. The facility is oriented to optimize natural light and landscape views in support of healing and rehabilitation, and dynamic finishes were selected to reduce the clinical monotony. The result—a cancer center designed from the inside out—is an important reminder that form doesn't follow function; form follows experience.

**Challenge:** A patient, over the course of treatment, will visit a cancer center more than 100 times. Given the emotions and stress that come with this schedule, ProHealth Care wanted to improve the patient experience by creating positive distractions through design.

The design team aimed to expand input from key staff members in the early planning stages. While most design processes incorporate interviews with a broad range of stakeholders and departments, the staff members who spend the most time with patients are often spoken to in isolation about the specific aspects of the project that relate to their role. The design team hoped instead to incorporate their feedback about the variety of ways they interact with patients in diverse environments throughout the building. The end result being to improve health outcomes in a setting that enables patients, families, and cancer survivors to better manage the life changes that come with a cancer diagnosis.

**Solution:** A patient advisory group including cancer survivors, current patients, and family members was assembled to provide input on the aspects of the care experience that were most important to them. To create a more patient- and family-centered environment, family zones were incorporated into infusion areas to include loved ones in the caregiving process. Larger treatment zones were designed to support more in-room procedures, and related services were co-located to facilitate multidisciplinary care. Nature was used as a positive distraction throughout the facility. Patients now have access to fresh air via operable windows. Treatment

### Goal

Based on an understanding of the indoor and outdoor environments' impact on health, the design goal of the project was to enhance the family, staff, and visitor experience using a "whole person health-care" approach. The guiding principles used to achieve whole person health at this landmark cancer center were to empower the patient; use nature as a positive distraction; empower staff; and promote health.



ProHealth Waiting Area,  
© Craig Dugan Photography,  
January 2016

areas offer direct access to outdoor gardens and spaces where patients spend hours at a time, were oriented toward a scenic pond.

The "Whole Person Health Design Team" was made up of staff

members who spend the most time with patients across multiple settings. Encouraged to draw on their vast experience to develop design concepts, the team created "multidisciplinary day suites": adjoining exam and consultation spaces that allow patients to remain in a single location throughout consecutive appointments with specialists. The team also inspired the design of outdoor pedestrian walkways to give patients and staff the opportunity to decompress and connect with nature.

Design solutions intended to improve the work experience were incorporated. Staff was given access to personal spaces, lounges, and outdoor areas to help them de-stress, and natural light was maximized in work areas, offices, and staff lounges. New daycare facilities were a recognition of staff members' family commitments.

**Results:** Throughout the design process, current utilization, projected volumes, clinical quality metrics, and clinical and patient flows were collected and analyzed to determine the ideal model of care, as well as optimized future state flows. The design team worked closely with ProHealth to customize metrics for growth, fiscal stewardship, clinical quality, service excellence, staff alignment, and operations, and to track and monitor performance during the implementation phase.

Next steps at ProHealth Cancer Center include measuring the outcomes of the initial project goals. The evaluation will focus on three areas: clinical quality indicators, patient satisfaction, and financial return. Positive/negative and integrative well-being ratings will be included in future assessments to track clinical progress and or recovery from illness with treatment. Other project goals will also be measured by assessing patient and family satisfaction and efficiency, reduction in operating costs, staff attrition and recruitment.



# Erdman

Lehigh Valley Hospital, Muhlenberg, Family Care Pavilion  
Bethlehem, PA



Private NICU Rooms from Care Team Perspective, Erdman/Andrew Harris, June 2017

## Goal

Lehigh Valley Hospital aimed to create a patient-centered experience by incorporating evidence-based design to improve outcomes and increase satisfaction for patients, families, and staff. More broadly, the project increased access to healthcare for women and children in the community, as well as patients requiring inpatient rehabilitation services.

## EBD STEPS APPLIED:



**Overview:** The Family Care Pavilion on the Muhlenberg Campus is a 163,000 square-foot addition to the Lehigh Valley Hospital. The four-story pavilion includes an inpatient rehabilitation unit on the first floor; obstetrics (labor and delivery) on the second floor; and both post-partum services and a level II NICU on the third floor. The project also made obstetrics and rehabilitation care available to a community that previously had none.

**Challenge:** The desire to deliver a patient-centered experience led the system to adopt new operational and staffing models, such as private rooms (including the NICU) and integrated care team (ICT) models. These changes required extensive work sessions with patient and family advocacy groups, as well as staff members. Full-scale mock-ups and rapid prototyping sessions helped users visualize the proposed environments of care and provide feedback.

Lehigh Valley Hospital Network explored multiple planning options for the project. To ensure an efficient and effective project delivery process, they decided to implement single-source project delivery—the first such initiative for the organization on a project of this size and complexity.

Placing and fitting the Family Care Pavilion on this site was another challenge due to the position of the existing buildings, their varied architectural features, and the infrastructure on the campus. Site development work connected the new pavilion to the hospital and enhanced patient access by establishing a private entry for patients and a covered entry for ambulances.

**Solution:** The design solution included all-private rehabilitation and obstetric care rooms, including the NICU. Additionally, both programs provide amenities for families during daytime visits, overnight and extended stays, including lounge and activity spaces, medical education spaces, sleeping areas, and a café. Alternative birthing options are also accommodated. Patient bathrooms in the labor and delivery unit feature hydrotherapy showers, and additional space was allocated at bedsides to allow family participation. All patient care spaces have access to daylight and nature views, and an outdoor garden space was developed for all patients and for rehabilitation activities based upon a review of research.

An integrated care team model was introduced to both departments, along with ICT workspaces, to enhance collaboration between caregivers and increase operational efficiency (e.g., reducing travel distances and consolidating staff). Support service spaces were organized using Lean principles to reduce time spent searching for supplies while standardizing methods to organize, sort and display supplies. Staff can also access off-stage respite areas for recharging and reflection.

**Results:** When the Family Care Pavilion opened its doors in June 2017, the all-private room model and hospitality amenities were well-received by patients and families. Admissions have exceeded the organization's goal, and staff within the health system have shown interest in transferring to the new site (citing the ICT model and staff amenities as substantial draws).

Post-occupancy evaluations and user group surveys will be conducted at the one, three, and five-year marks to measure the project's success against the metrics established during planning and design. Some of the metrics to be tracked include patient satisfaction, provider retention, noise complaints, footsteps per provider, and patient wait times.

## EBD STEPS APPLIED:



**Overview:** Essentia Health Spooner Clinic is a 15,000 square-foot rural clinic attached to Spooner Health System Hospital in northwestern Wisconsin. Opened in fall of 2016, Spooner Clinic has 20 exam rooms providing primary care and family practice clinics. Specialty care outreach clinics, such as orthopedics, are also available, with clinicians rotating in from Duluth. The footprint also includes imaging and lab services.

**Challenge:** In 2014, Kahler Slater conducted a nationwide survey of ambulatory care models to identify trends and select a model for their upcoming Essentia Health project. After a comprehensive review, the ICT model was chosen as it fosters efficient collaboration among caregivers working at the top of their license and prioritizes physician and staff time.

The clinic design needed to address multiple priorities: reducing staff footsteps, increasing collaboration, broadening exposure to expertise, increasing patient access to caregivers, maintaining privacy, and operationalizing self-rooming, while serving a rural population with primary and specialty care services.

**Solution:** The team worked together to break down the silos of private physician offices, replacing them with flexible work areas adjacent to exam rooms where providers, nurses, and medical assistants could work side by side. The design has allowed staff members more time for patient care, documentation, and follow-up, with fewer interruptions.

Offering a choice of work areas, including huddle zones, private discussion zones, and sit-stand workstations, keeps the team within a collaborative zone. Additionally, floor-to-ceiling windows provide staff with views of nature and generous natural light, resulting in a restorative working environment.

The ICT model promotes flexibility by accommodating various operational models and associated staffing needs for both primary and specialty care clinics. Leveraging opportunities for collaboration, providers conduct consultations on the fly between scheduled appointments, reducing both the length of patient visits and the need for additional appointments. The clinic also supports Telehealth, which further increases the breadth and depth of clinical expertise available to patients and staff.

The double-sided exam room allows for increased utilization when flexed between primary care and specialty clinics, maintaining front-of-house and back-of-house circulation with minimal additional square



### Goal

The goals were to promote staff connection and collaboration using an Integrated Care Team (ICT) model, to increase efficiency, and to simultaneously enhance the patient and staff experience.

Main: Essentia Health Integrated Care Team Area, Wheelock Photography/Dana Wheelock, June 2017  
Small: Essentia Health Spooner Clinic Footsteps Study, Kahler Slater, Inc., May 2017

footage. Acoustics are controlled by high-performance door sweeps and seals, allowing providers the efficiency of dictation at their workstations following an appointment.

**Results:** A post-occupancy shadowing study demonstrated that the most frequent trips made by a medical assistant (37%) were between the exam rooms and the workstation. Further analysis showed that staff footsteps between exam rooms and the workstation were reduced by an average of 75% compared with the old facility. This, combined with the elimination of medical assistants' roundtrips between the workstation and the physician's office (an average of 120 feet), has resulted in a dramatic decrease in overall staff footsteps compared with their previous building.

## EBD STEPS APPLIED:



**Overview:** Ohio Health Dublin Methodist Hospital was designed to redefine the way patient care is delivered in central Ohio. As part of The Center for Health Design's "Pebble Project," Dublin Methodist's original design team created a design process capitalizing on the experience of other Pebble Partners, using key research findings, national benchmarks, and best practices where available. The focus of the research included several studies about safety, the patient and family experience, work processes, culture, and return on investment.

When Dublin Methodist opened in 2008, it was considered one of the first hospitals to comprehensively incorporate evidence-based design (as it was understood at that time). The success of the hospital and its subsequent growth have necessitated the fit-out of all-shell space, as well as the use of soft space for clinical functions. A master plan was recently completed to accommodate the hospital's expansion.

**Challenge:** In 2015, AECOM was engaged to fit out the existing shell space with a 20-bed inpatient unit. The design team conducted a post-occupancy evaluation (POE), and a hospital task force also completed an evaluation to determine what changes should be made going forward.

While the intent was to replicate the look and feel of the existing nursing units, there were lessons to be learned from the previous design to inform the new one. The most significant change from the original design was to abandon the acuity-adaptable nursing model. The hospital's original design featured identical patient rooms that could support everything from general acute care to critical care, allowing the patient to remain in one place while nursing staff appropriate to their required level of care moved from room to room. After four years, the hospital found it difficult to build a stable critical census and decided to return to an aggregated model of care.

**Solution:** Since all of the inpatient rooms were designed to be identical to support a critical care level, no physical redesign was required. However, several other changes were made to respond to patient or operational needs. Eliminating the pull-down doors designed to conceal medical gases and installing cabinets in their place allowed additional storage space for supplies. Storage space was also added for patient and family belongings under the desk at the windows and in



Dublin  
Methodist  
Photography,  
© Brad  
Feinknopf/  
OTTO, 2015

the bathrooms for toiletries. Patient amenities were expanded to include clocks, as well as supplementary outlets for charging cell phones and other devices.

The original technology interface was installed on an articulating arm over the bed. A change in EMR providers, along with other software changes, prompted the decision to switch to a bedside computer.

The multidisciplinary collaboration space was replaced with staff teaming and break rooms, and one consultation room became an office for the nursing director. Multiple areas were built into the revised configuration to better accommodate trash cans in order to enhance the patient, family, and staff experience.

## Results:

In addition to the key findings in the nursing unit, a series of general findings were identified from the post-occupancy evaluation. One major finding was the importance of durable materials in a hospital environment. For example, stained concrete floors were used in the lobby and public corridors as a cost-effective measure for high-traffic areas. Unfortunately, multiple cracks have appeared in the flooring as the building has settled. The hospital has begun to cover the concrete floors with resilient flooring to improve their appearance.

There were many positive findings associated with the evidence-based design features. These include the use of daylight in 94% of occupied spaces; the extremely quiet environment; the distributed care work areas fostering collaboration with patients, families, and caregivers; the use of nature, natural colors and materials to create a soothing environment; and a commitment to the core values of the new culture cultivated at the beginning of the project.

During the POE, all of the original EBD design principles were also reviewed to determine if they had been accomplished and maintained. The overwhelming conclusion is that they were, and continue to be, key factors in the hospital's success, driving positive change throughout the OhioHealth system.

## Goal

The original goal throughout design and construction was to create a hospital that would fit into the community both architecturally and culturally, reduce feelings of fear and intimidation on arrival, provide a clear and simple wayfinding system, and empower patients and their families with a sense of calm and control in a restorative environment. A research program was developed to evaluate the project and publish the results as a contribution to the healthcare design field.



EBD STEPS APPLIED:

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**Overview:** Phase I of Florida Hospital Winter Garden is a 93,000 square-foot facility that includes a 16-bed emergency department, a 12-bed observation unit, an outpatient surgery center, urgent care, imaging, and medical office space. Future phases will include a 350,000 square foot, 200-bed hospital and a 180,000 square foot medical, retail, and cancer center designed to create an integrated physician model.

The campus was designed for ambulatory care, and the system wanted to focus on convenience, cost-effectiveness, Lean design, sustainability, and integration of the clinical areas. Plans for expanding the emergency department through additional observation bed space have been incorporated into the design.

**Challenge:** The owner issued an RFP that consisted of a single question: "How would you design a greenfield hospital, given your understanding of the future state of healthcare?"

Other challenges associated with the project included managing the operational flow through design and addressing the shift away from the traditional model of physician practice toward a more integrative approach as the trend continues with physicians being employed by health systems or aligned physician groups.

**Solution:** Collaborative planning was embedded into the project design. Since Winter Garden was the first greenfield facility built by Florida Hospital in over 20 years, project champions wanted to ensure the design reflected the best thinking of the system. However, as the facility was new, no existing staff members were available to act as a traditional user group. Instead, the system chose to bring its brightest thinkers to the design process, asking



**Goal**

The goal for the project evolved from a simple philosophy to change from a design focused on caring for the sick into one focused on overall well-being. Guiding principles focused on the patient experience, integration, and system thinking.

# ESa (Earl Swensson Associates)

Florida Hospital Winter Garden  
Winter Garden, FL

Right: Florida Hospital Winter Garden Exterior, Attic Fire Photography, February 2016  
Left: Florida Hospital Winter Garden Interior, Attic Fire Photography, February 2016



them to challenge any preconceived notions about the way services have been traditionally delivered. Their intention was to avoid the phrase "this is the way we've always done it" in favor of "this is the way we should do it."

By focusing on the patient experience and applying an on-stage/off-stage design philosophy, the design team hoped to streamline wayfinding to reduce stress and avoid wasting patients' time. To this end, they ensured that nearly half of the emergency beds in the freestanding ED were located within a short distance of the lobby. Patients can access the room from one side, and staff members from the other. Moreover, lower-acuity patients can be treated in the beds nearest the lobby, and isolated from emergency patients who require more complex care.

**Results:** Since Winter Garden is a greenfield facility, there is no prior data available for analysis or comparison. The goal is to improve utilization of low-acuity treatment rooms, allowing the system to increase the number of patients seen per year in a given exam room. A metric of 1,750 visits per room per year was used for planning based on anticipated volumes. The team aims to assess the results after their first year of operation—anticipating that this metric will be exceeded.

## EBD STEPS APPLIED:



**Overview:** CAMA, Inc., in conjunction with HKS Architects, has collaborated with Piedmont Atlanta Hospital (PAH) to redefine the patient and family experience with a new surgical bed tower. The first phase of construction included 10 new operating rooms, eight cardiac catheterization labs, four cardiac electrophysiology labs, 42 critical care beds, and 90 acute care beds. CAMA served as the experience design consultant for the project.

**Challenge:** The project team, led by HKS Architects, comprised 122 design and construction professionals from 33 firms. Over 400 Piedmont physicians and staff participated in five weeks of experience workshops to map the future workflow of the building, six weeks of workshops to design the building, and two weeks of workshops to design the medical equipment and information technology to be included in the building. Over 500 patients and their families participated in patient advisory design workshops and completed online surveys through Piedmont's Patient and Family Advisory Council.

Given the number of players and the speed at which the project progressed, CAMA's biggest challenge was to devise creative ways to gather information and ideas from patients, family, and staff—and communicate them to the design team in an effective way so they could influence design solutions.

**Solution:** After facilitating a series of visioning workshops with the Piedmont staff and patient advisors, CAMA captured their creative design ideas in a report. The report—which included an exploration and enumeration of the driving forces behind the patient experience movement, highlighted industry best practices, and analyzed existing conditions at PAH—was updated and refined throughout the planning and design phases. The report also included several tools to aid the design team as they shaped the new hospital tower, including a set of experiential room data sheets and maps. The data sheets provided design recommendations and checklists for key locations, while the maps helped the client visually understand the relative scale and proximity of these

### Goal

The goal of the project was to explore the broad collection of experiences across the continuum of care that can influence the overall impression that patients and their families have within the hospital campus, from arriving on-site, entering through multiple front doors, seeking out information, navigating the building and the rest of campus, preparing for surgery, occupying time in between, recovering in the patient room, the discharge process, and finally returning home.

Graphic Booklet of Survey Findings completed by Patient and Family Advisors for Piedmont Atlanta Hospital, CAMA, Inc., June 2017



key spaces (which, when taken together, have the biggest impact on the overall care experience).

This body of work culminated in the creation of a Patient Field Guide to introduce the new hospital tower to patients and their families. The Field Guide highlights the hospital's many thoughtfully designed features and amenities, while also situating the building contextually within Piedmont Atlanta Hospital's health campus and the surrounding community.

**Results:** CAMA worked with Piedmont Atlanta Hospital's marketing team to generate an electronic survey exploring how specific design features within the existing hospital influence the patient and family experience. The survey was distributed to Piedmont's large network of patient and family advisors and received over 500 responses. Among the survey's most interesting findings was that, for many patients and visitors (over 25% of respondents), the entrance was not clear on arrival. A total of 28% needed some form of assistance upon arrival. Only 1% reported that the existing patient guide was helpful; yet access to information was identified as the third most important to family and physicians. CAMA created a booklet with graphics summarizing the survey findings, along with annotated renderings of the new hospital tower explaining how specific design features are intended to address desirable outcomes. The booklet was distributed to the entire network of over 2,000 patient and family advisors.

## EBD STEPS APPLIED:



**Overview:** Children's Health purchased an existing hospital and pediatric inpatient clinical program to provide new services. It was clear that the existing facility required renovation—as did an additional outpatient specialty clinic at a second location.

Corgan was tasked to design these two new environments to work as one and, through a collaborative visioning process, a single vision was achieved. The project ultimately included a 40,000 square-foot inpatient renovation and a 27,000 square-foot outpatient renovation.

**Challenge:** Although the existing programs shared similar visions in terms of the patient experience, they had very different ideas about how to accomplish their goals. Facilitated visioning sessions were necessary to break down communication barriers so that each program could be heard and understand the other's priorities. The design meetings were held in "big room" format to involve all parties, engage in meaningful conversations, and maintain momentum.

**Solution:** The design and clinical team used art and nature as their inspiration to create interactive spaces to promote healing and working. Examples are: the "cave," which has become a space to work independently, a waterfall and a lily pad pond that provide a path of travel for youngsters, while "bee hive" recesses provide storage spaces. Whimsical water and forest creatures appear on corridor walls to calm, reassure, and amuse patients and visitors.

The integration of artwork in the design of circulation and clinical spaces provides both a positive distraction and intuitive wayfinding for patients and staff. This aspect of the design is supported by research data collected

### Goal

The goal of the project was to provide a warm and "funful" (fun and playful) environment for families, patients, and staff that would support these guiding principles:

- Collaboration – teams work together toward a common goal to create a family-centered environment for diverse populations.
- Cutting Edge – capitalize on technology and evidence-based design concepts to connect patients and encourage staff innovation and collaboration.
- Efficiency – minimize waste in utilization of space, technology, and finances to produce a flexible, connected environment.



Children's Health, Our Children's House Hospital Renovation and Specialty Center 2, Corgan, February 2017



by Jean-Phillipe Gouin and Janice K. Kiecolt-Glase showing that "psychological stress leads to clinically relevant delays in wound healing." In other words, both adults and children benefit from the escapism that art (and "funfulness") can provide.

The floor and wall art provide color and whimsy that contrast with the standardization and uniformity of most healthcare environments. A memorable art element has been shown to support the brain's subconscious mapping and assists in wayfinding, giving patients and their families a sense of control over their environment and the treatment process and minimizes the anxiety of not knowing how to navigate in the clinic or on the patient floor. This empowerment, in turn, can have patients and families be more open to receiving instruction from their care team and sharing important information about their condition.

**Results:** The facility opened its doors to patients in June, 2017. The team is committed to surveying both visitors and staff to gauge their feedback on the strategically placed wall and floor art as architecture.



## EBD STEPS APPLIED:



**Overview:** To this day, infectious diseases often reach epidemic proportions. The recent Ebola outbreak killed approximately 11,000 people, spreading from person to person through contact with bodily fluid. This design project originated in July 2014 at the height of the Ebola crisis, when the world was scrambling to identify, contain, treat, and cure the disease. Heulat Davis was retained by a fabrication vendor to design a fully self-contained treatment modular that could be shipped immediately to ground zero sites. A team was established which included an Ebola specialist; a clinical researcher; manufacturing, engineering, transportation, and fabrication experts; and our own design team.

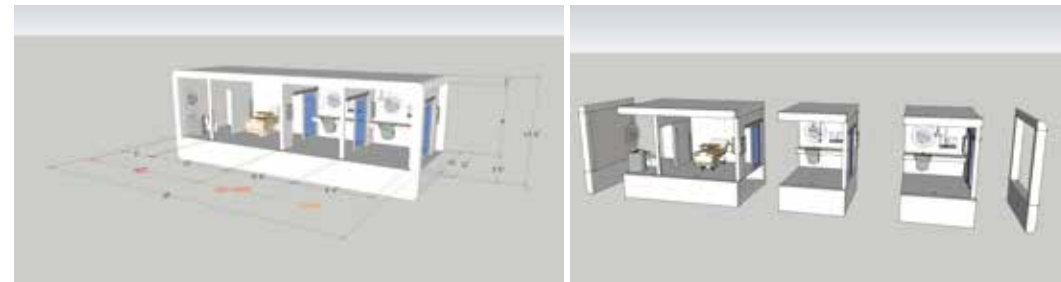
**Goal**

The goal of the project was to create a meticulous infection control space that would be safe for caregivers and patients, easy to clean, a beautiful design, anxiety-reducing, and cost-effective to build.

**Challenge:** The design team faced multiple challenges in planning a new and unique prototype design, in addition to addressing client expectations. The client's top priorities included:

- Safety: The design team had to create a high-tech sterile environment that was supportive, safe, and patient-friendly, without previous examples or sites to investigate.
- Timing: Due to the rapid spread of the disease, urgency was crucial.
- Reliability: The design would have to be put to use as soon as it was ready, since no time was available to test the hypothesis.
- Size: The module would have to accommodate the four-step treatment process and fit on a flat-bed truck and in a shipping container.
- Waste mitigation: The project would require a hazardous waste management system that could function without human contact.

**Solution:** Ultimately, the design solution was conceptual only. The module was not built or field-tested due to the successful management of the 2014 Ebola outbreak. The team did, however, complete a modular prototype that met all of the safety, waste mitigation, clinical protocol, and patient care criteria, in addition to the shipping and transportation requirements.



Top: Ebola Pod Rendering; Left: Ebola Pod Modular Units; Right: Ebola Pod Perspective View  
Huelat Davis, February 2015

**Results:** Preliminary findings indicate that it is possible to design a built environment for infectious disease where patients can be safely treated (the project hypothesis).

Research included findings about the care and treatment of persons with infectious diseases, lessons learned from Ebola outbreak sites, and key research about infection control. Our preliminary studies found that the unit design allowed for both flat-bed trucking and overseas shipping. Moreover, setup is possible in most locations, from existing hospital parking lots to rural settings. Next steps identified by the team would include a full mock-up with observational studies, patient input, a full engineering study, and cost analysis.



EBD STEPS APPLIED:



**Overview:** When Northeast Georgia Health System decided in 2015 to build a new 100-bed hospital on a greenfield site in Braselton, they invited staff within their existing system to participate on the design team—many of whom would not go on to work in the new building. An initial challenge of the project, then, was how to build a hospital around operations that were being developed for future staff. In response, the design team developed a list of critical to quality (CtQ) needs: a Lean term that identifies critical components of a process that leads to quality outcomes. These CtQs became the cornerstones for operational and design decision-making throughout the project.

**Goal**

The research plan was to conduct a post-occupancy evaluation at the existing hospital focused on three major goals: 1) Study the current inpatient units to inform design modifications for the build-out project. 2) Derive lessons learned from frontline staff of the Braselton Hospital about what was working well, and what could be improved. 3) Evaluate quality outcomes for the CtQs that had been developed for the Braselton Hospital.

After using the new facility for over a year and with it now exceeding capacity, the owner decided to move ahead with the build-out of the final floor. Prior to design, however, a team of researchers was asked to conduct a rapid post-occupancy evaluation to capture lessons learned from the CtQ implementation.

**Challenge:** To keep up with the project schedule, researchers were challenged to tailor a plan for a two-day onsite visit. Ultimately, a mixed-method approach was used to maximize time onsite and ensure findings could be triangulated.

**Solution:** The research team’s study included focus groups, interviews, and observations. On day one, a two-hour focus group was conducted in the morning with unit managers and supervisors. Using the CtQ list as a template, the researchers reviewed each critical need and asked how it was working. Information gleaned from this focus group was then used to develop questions for one-on-one interviews with frontline staff on day two. While this took place, a process engineer shadowed staff members, gathering time, activity, and motion data using an iPad application.



Inpatient Unit Staff Collaboration Hub,  
© 2015 Darris Lee Harris

**Results:** Overall, the findings supported the design intent of the original CtQ metrics. Comments included:

- Flexibility: “I think that it is pretty well planned out, having med rooms on each end.” “Step-down patient rooms in ICU provide overflow rooms.”
- Collaboration: “Collaboration areas are in the right location.”
- Efficiency: “It is nice that you can look up and down the hall and see everything, whereas previously, you had to walk to the intersection to see what is going on.” “Nurse servers support our work.” “The sink location in the room supports good [infection control] technique.”
- Aesthetics: “[When] people come in, they are happy and it makes them feel like they have a better experience.” “I think it’s a beautiful facility, nice to be in a new hospital.”

After reviewing the results of the post occupancy study, the buildout of the final floor will be done with minimal modifications from the original design.

EBD STEPS APPLIED:



**Overview:** The Virginia Department of Behavioral Health and Developmental Services (DBHDS) operates the Virginia Center for Behavioral Rehabilitation (VCBR), a facility for sexually violent persons who, after serving their criminal sentences, are committed by the courts to the facility for behavior modification treatment. In 2013, DBHDS asked HDR to prepare a pre-planning study to help determine the feasibility of expanding VCBR. Upon completion of the study and project approval, HDR was selected to design VCBR's 2015 expansion and renovation.

**Challenge:** The guiding principle of the project was to improve VCBR's capacity to treat residents in a safe and multi-tiered environment that allows for increased responsibility and self-management as residents progress through the behavioral treatment program. This led to the decision to conduct an ongoing research study that will evaluate the hypothesis that the architectural design of the VCBR expansion may be associated with improved resident outcomes—both during treatment and after their release.

**Solution:** Relevant design features included space and circulation planning intended to mitigate security incidents. Transitional resident spaces were also incorporated to facilitate the development of residents' daily living skills (crucial factors in their ability to successfully transition back into the community). Specific emphasis was placed on the creation of a treatment-friendly environment that emulates a small community to provide a normative experience for patients and staff alike. The facility currently lacks a modern, functional treatment mall—a critical aspect of the project. Once introduced, however, the new mall will unite existing and new components of the project in a “beyond state-of-the-art” approach to planning, design, and operations.

Key program components include the large, centralized treatment mall; a park-like garden directly off the mall; educational, vocational, physical, and leisure activity spaces; and a variety of treatment areas (medical, dental, and behavioral health). Additionally, a 258-bed housing expansion will be established for special needs residents (e.g., medically and psychiatrically complex, intellectually disabled, and detainee and detention cases) as well as transitional populations.

**Results:** The pre- and post-design intervention evaluation includes analyses of outcomes from within-subjects (same residents) and independent subjects (different residents) in the current and the new/renovated facilities. Measurements include aggressive incident frequency and severity,



Main: A Community Space with Ample Daylight, HDR, 2017 Rendering  
Small: Access to a Market, Library, and “Central Park” from the Mall, HDR, 2017 Rendering

incidence of suicide-related behaviors, and frequency of conditional release failures, with analyses controlling for a range of potential confounding factors. Baseline data collected in the fall of 2016 revealed that the residents most prone to aggressive incidents, with the highest incident frequency, were neither mentally nor intellectually disabled. While the majority of residents involved in aggressive incidents targeted fellow residents, those with mental disabilities were more likely to target staff. The data also indicated that the aggressive, non-mentally disabled population specifically targeted the mentally disabled residents.



**Goal**

VCBR is a behavioral health facility serving a unique and highly complex population of formerly incarcerated residents. The goal of the project was to create a safe and therapeutic environment that promotes successful rehabilitation and transition back to society.

Based on the project team's expertise in behavioral health best practices, a recommendation to separate these populations was implemented. Follow-up data will be collected prior to the start of construction in the fall of 2018, and again once the new/renovated facility is in operation (projected for 2021). HDR is willing to share the research plan and design and baseline resident findings.

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