



EVIDENCE-BASED DESIGN IN PRACTICE

**Healthcare Design Case Studies from
EDAC Champion and Advocate Firms**

2016



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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Become EDAC certified.

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 1,900 individuals worldwide have obtained the EDAC credential. Currently, 46 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



Steelcase Health is EDAC's Educational Partner, offering study sessions and other resources to help prepare for the EDAC exam.

EBD STEPS APPLIED:



Overview: The facility is an 89 bed forensic mental health care facility dedicated to the treatment and rehabilitation of clients, who due to mental illness have been judged "criminally not responsible" for their actions and are mandated to a time of healing at the facility. There are three main components: a "house", "neighborhood" and "downtown" representing the transition towards recovery and return to the community.

Challenge: The challenge was to select colors that promoted healing for clients whose illness is varied and may react differently to color or image stimuli. "Baker-Miller Pink", as documented in a study by Bennett (1991) to reduce aggression or anti-social behavior, has formed the basis of institutional color palettes. The overuse of certain blues and greens in mental healthcare environments has been reported to exacerbate depression and create an institutional feel (Dalke et al., 2006). However, some found there is no clear evidence that color affects mood, emotions, or psychological well being in any systematic manner (Evans, 2003).

Solution: A robust document review was undertaken including more than 30 journal papers as well as industry websites and design guidelines. Research found corroborating evidence that vibrant colors contribute to a more comfortable healing environment while reducing the stigma associated with mental health without invoking agitation and behavioral outbreaks associated with color stereotypes. To maximize the impact and positive benefits, careful consideration was given to associating colors with the designated areas.

Input was collected from clinical users who had amassed their own body of knowledge, stakeholders who had experience with color therapy, as well as anecdotal evidence from their own professional experience. Color palettes were presented to the clinicians for approval.

More vibrant and saturated colors were selected for use in the "Downtown" – active social hub, while warmer soothing colors were used in the residential areas, such as the "House" including patient sleeping areas. Larger spaces used vibrant accent colors, such as indigo, red, and violet, juxtaposed with warm neutral shades to create vibrant spaces to encourage clients, while simultaneously providing moments of calm. In smaller more intimate spaces, soothing shades, such as orange, were selected to promote self-esteem and optimism (Cognitive Behaviour Therapy Self Help Resources, 2012). Accent colors in these spaces were limited to one wall. This strategy also reinforced way-finding to navigate the facility.



EBD Goal:

To challenge the aesthetic typically associated with a forensic detention facility and support the client's healing process by using color to enhance the environment and improve the staff work environment.

Small: Central Downtown Space
Main: Neighborhood Patient Recreation Space
Shai Gil Photography, 2013

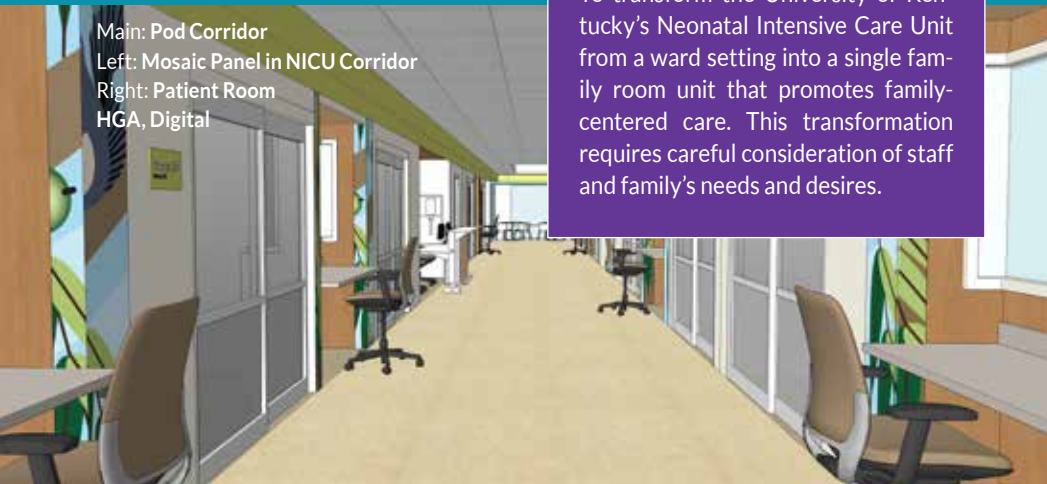


Results:

One-year post occupancy, an online survey of staff, clients and designers was conducted using a Likert scale, rating color effectiveness from "ineffective to very effective". Respondents had an average rating of "effective" with no rating below "fairly effective". The only negative feedback was that the use of color didn't extend throughout the facility. Studies in 3-5 years will focus on: if the use of vibrant color provides lasting positive reinforcement, if habitation diminishes the benefits, if the response to color differs seasonally, and if color has any measurable impact on medication reduction/dependency.

HGA Architects and Engineers with Smith Hager Bajo, Inc.

Kentucky Children's Hospital at the University of
Kentucky HealthCare
Lexington, KY



Main: Pod Corridor
Left: Mosaic Panel in NICU Corridor
Right: Patient Room
HGA, Digital

EBD Goal:
To transform the University of Kentucky's Neonatal Intensive Care Unit from a ward setting into a single family room unit that promotes family-centered care. This transformation requires careful consideration of staff and family's needs and desires.



EBD STEPS APPLIED:



Overview: The 44,000 square-foot NICU renovation at Kentucky Children's Hospital (KCH) at the University of Kentucky HealthCare includes 70 beds relocated to the first floor of the hospital. The NICU provides a full spectrum of care for critically-ill, premature, moderately ill and convalescing infants.

Challenge: To address how the designed environment influences the delivery of quality care, a systematic approach to collect pre-occupancy quantitative and qualitative information that represents the "voice of the customer" (VOC) was devised.

First, the team developed and customized questionnaires for both family and staff members of KCH to understand the level of satisfaction with various characteristics related to unit layout and patient spaces. The data was analyzed to identify significant predictor variables and common themes. For example, predictor variables for staff satisfaction included noise level, electric light, the amount of work surface area and availability of workstations.

Next, semi-structured focus groups were conducted. The topics were directed by significant questionnaire findings. Focus group members were: parents of previous NICU patients, NICU staff, and current parents of patients.

Information from the questionnaires and focus groups were utilized to create a customized design criterion of "needs" and "wants" that truly represents the VOC. Although not necessarily exclusive, the criterion did capture important design qualities that were found significant by users of the space. This criterion was combined with project goals and objectives, presented to the design team and used to evaluate prototypes and design concepts.

Solution: The new 70-bed NICU at Kentucky Children's Hospital has six pods of approximately 12 single family rooms in each. The pods create identifiable care communities among staff and families within the larger unit, a key VOC finding. A dedicated team huddle space to foster collaboration, along with immediate access to supplies, medications and infant milk storage to increase efficiency are found within each care community.

Visibility, safety and security were other VOC needs expressed by families. Single family rooms are visible by multiple nurses within the care community from decentralized nursing stations positioned between the sliding glass doors of two rooms. Caregivers also have access to bedside charting and local supplies within the rooms. The family zone, per the request of the families, will have spaces for personal storage and rooming-in capabilities.

To build a sense of community and support for staff and families, both staff and family lounges are centrally located on the unit and serve as a private place to decompress while remaining close to patients. To promote a calm ambiance, all circulation corridors are lit with natural and soothing lighting.

Results: Completion is scheduled for fall 2017. To ensure that design solutions achieve success and reflect the VOC, similar research tools used during pre-design will be implemented approximately six months post-occupancy to confirm if significant differences have occurred.

EBD STEPS APPLIED:



Overview: Baylor Scott & White Health wanted to design a new outpatient center on the Hillcrest Baptist Medical Center campus. Located at the entrance of the medical center campus, the cancer center is an extension of the many services provided by the Hillcrest Baptist Medical Center Hospital. The public space of the cancer center is oriented toward the hospital, which is a familiar landmark in Waco.

Challenge: To achieve this goal, the design team integrated the latest research findings and evidence-based design strategies into the design of the cancer center. Specifically, the team hypothesized: that patient satisfaction and caregiver efficiency, morale, and satisfaction would improve by incorporating access to nature, natural light, outdoor views, and respite spaces for privacy and reflection. Incorporating these elements while creating convenient and accessible spaces that met the project budget and programming requirements was challenging. The programming requirements included: radiation therapy, 20 semi-private infusion therapy bays, imaging, CT Scanner, two linear accelerator vaults set up for two Varian "Truebeam," dosimetry space, team station, exam, consult and treatment rooms, lobby, conference room, staff area, and a chapel.

Solution: The entire center is designed to create a low-stress, positive experience for patients receiving this specialized care with convenient and accessible spaces. The central team area offers patients one single location to be assessed and receive necessary services e.g. blood draws, prior to treatment. This concept allows radiation and medical oncology staff to collaborate and work with patients and their family on treatment options. After patients are assessed they can head directly to either radiation or medical oncology. As an added benefit, patients that frequently receive treatment can bypass the standard patient flow and go directly to the changing area and the appropriate treatment area, after a quick stop at the main reception area.

Natural light, views, and access to nature were emphasized as key strategies to promote healing and increase user satisfaction. A private garden provides scenic views for patients receiving treatment in one of the 20 infusion bays, while also connecting the landscape to the existing campus grotto. The integrated facility also includes a dosimetry space, allowing specialists to pinpoint tumors and target treatment, and a dedicated pharmacy where specific cancer drugs are mixed and quickly transported to the treatment area. A non-denominational chapel provides a respite area for patients and families.

Results: A post-occupancy evaluation is currently being conducted to gather feedback from occupants on their satisfaction with the building design and measure the effect of these and other design interventions.

HDR Architecture, Inc.

Baylor Scott & White McClinton Cancer Center
Waco, TX



EBD Goal:

To create a low-stress, positive healing environment for oncology patients and staff through the implementation of evidence-based design strategies in the design of a new cancer center.



Scenic Infusion Bay
© Dan Schwalm/HDR

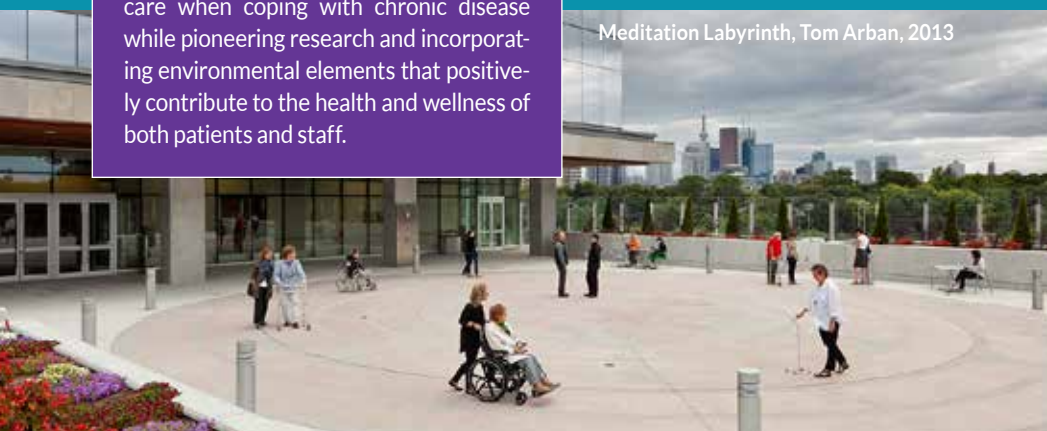
Stantec Architecture / KPMB Architects – Design and Compliance Architect | HDR Architects / Diamond + Schmitt Architects

EBD Goal:

To provide transforming care to individuals who require rehabilitation and complex care when coping with chronic disease while pioneering research and incorporating environmental elements that positively contribute to the health and wellness of both patients and staff.

Bridgepoint Active Healthcare Toronto, Ontario Canada

Meditation Labyrinth, Tom Arban, 2013



EBD STEPS APPLIED:



Overview: The new 10-story, 464-bed, 680,000-SF Bridgepoint Active Hospital provides a stepping point between acute care and a return to independent living. Built on an historic site, this referral hospital responds to the region's need for increasingly complex chronic healthcare while maintaining an important communal space that incorporates the roles of civic building, urban place, community center, and healthcare site.

Challenge: A significant challenge for the design team was to accommodate all of the functional program requirements and patient, staff and visitor needs while connecting the hospital to the larger community through: landscape design, community involvement and history. From the inception of the visioning process, re-connection with the adjacent residential neighborhood and beautiful natural parks were key objectives. With a site history tied to isolation and separation, Bridgepoint needed to reintegrate themselves as active members of the community, bringing the community back to the site through this redevelopment.

Solution: To support a path to health, a “campus of wellness” for the patient and the regional community was created; one that would enhance the patient's connection to community, nature, and the urban environment by inspiring physical activity and increasing chances for social interaction within the space.

Many design strategies and innovations were included as the result of active and intense participation of hospital representatives, clinicians, patients, architects, engineers, and community members – all driven by the hospital's vision of active healthcare. The heart of this project is the patient experience, which is designed to promote a sense of wellness, support, and empowerment. Spaces are open, bright, and active. Specific design solutions include:

Community connection – a Village of Care

- Site plan reorganizes the site with the historic Don Jail (hospital administration services) occupying the central square.
- New parks and a civic plaza complete the campus.

Patient focus

- Patient rooms maximize natural daylight and views.
- Social and dining spaces encourage social interaction and healthy nutrition. (the café and terrace on the main level are constant hives of activity)
- Therapy spaces are dispersed throughout the building for easy access.
- Quiet, calm spaces are incorporated throughout for respite.
- Barrier-free pool provides therapy with a glass wall, allowing clinicians to easily monitor exercise.
- Connection to nature includes a meditative labyrinth.

Family and visitor focus

- Designs engage family members in the healing process.
- Rooms provide ample space and furniture for visitors.
- Dedicated family lounge on each floor.

Staff focus

- Uplifting environment promotes a safe, secure, and stress-reducing place for staff.
- Functional and efficient design supports effective patient treatment and management.
- Consideration of all design factors for a positive work environment: daylight, views, adequate space, noise, and privacy.

Results: Two years post-opening, Bridgepoint is achieving the vision of active healthcare holistically from treatment to education to research, and is an active and vital member of the community it serves. The post occupancy results show dramatic changes from the existing hospital, with 98.5% of patients stating they would recommend Bridgepoint to family and friends; stroke patients have reduced inpatient stay by 12 days; and 90% of staff members said they consider Bridgepoint a great place to work.

EBD STEPS APPLIED:



Overview: This project is a model for the renovation of other inpatient units in the North Tower at Froedtert Hospital. The shell of the inpatient bed tower is L-shaped and each floor is approximately 19,400 square feet with double-loaded corridors. The existing unit had 32 single patient rooms, with supplies and support areas centrally located at the elbow of the unit.

Challenge: To streamline care delivery and standardize workflow, Lean exercises such as critical-to-quality prioritization, peer-to-peer interviewing, and space adjacency diagramming were held with user groups. In addition, the evidence-base design process helped make informed design decisions and validated implementation of process improvement strategies.

Early in the design process, a three-day data gathering event was conducted on the existing medical-surgical unit. Staff and patients were shadowed and interviewed to understand current-state workflow patterns, operational needs, and users' perceptions. The quantitative and qualitative data gathered were analyzed and significant findings were listed as "needs". These "needs" were categorized into common themes to develop a comprehensive list of Critical-to-Quality (CtQ) metrics (patient satisfaction, family-centered care, physician satisfaction, efficiency, flow and utilization, and patient safety). The project team used this list to guide design decisions and operational changes, evaluate prototypes and assess mock-ups.

Common travel paths uncovered during shadowing were diagrammed in three proposed prototypes to compare differences in travel distances. This exercise was paramount in receiving buy-in from key stakeholders for room count and size. Future-state predictions were made by comparing current-state results in a benchmark database. For example, one design assumption estimated that approximately 6% to 9% of nurses' time spent traveling would be saved and transferred to time spent in patient rooms.

Solution: The new unit has 24 single-patient rooms, approximately 300 square-feet each. Each room incorporates bedside charting, hand-washing station, family zone, and a private toilet room. Decentralized features include: a nurses' charting station and supply server outside each room, medication dispensing and nourishment area in the middle of each corridor, and a central team and break area at the elbow of the unit.

Results: The same research tools used during pre-design were implemented in a three-phased post-occupancy evaluation. Shadow data were collected at 3, 8, and 12 months post-occupancy to determine if assumptions and

HGA Architects and Engineers

Froedtert & the Medical College of
Wisconsin Froedtert Hospital
Milwaukee, WI

EBD Goal:

To enhance staff efficiency, delivery of care, and the patient experience by leveraging both Lean and EBD processes in a medical-surgical unit. It was imperative that project goals and objectives were well-defined and that final solutions achieved a level of success.



Spacious and Private
Inpatient Room,
HGA 2015

predictions were met. The unit manager received a brief report summarizing the findings and operational suggestions.

The phased approach successfully documented how nurses' workflow became more efficient within the space over time. As predicted, time spent traveling significantly decreased ($p < 0.001$) by 6% or 36 minutes per nurse. On average, a nurse traveled 2.08 miles per 10-hour dayshift, which is one of the lowest recorded findings compared to other benchmark studies. Nurses spent approximately 45% of their time providing direct patient care, a 6% increase and 82% of nurses' time was spent on value-added activities, e.g. charting and retrieving supplies or medications. Over time, staff substantially reduced the frequency of trips to areas on the unit, resulting in a more efficient workflow. Since moving to the new unit, there has been a 25% reduction in ALOS (average length of stay) and an increase in patient satisfaction to 87%.

EBD STEPS APPLIED:



Overview: St. Louis Children's Hospital, BJC HealthCare, and Washington University Physicians decided to bring a full spectrum of services under one roof in the St. Louis Children's Hospital Specialty Care Center located in suburban St. Louis. The center serves children ranging in age from infant through teenager. Departments include surgery, pediatric acute wound service, pharmacy, imaging, lab spaces, orthopedics, infusion, pediatrics, audiology, ophthalmology, psychology, and therapy functions.

Challenge: Engaging pediatric patients to make return visits for treatments and appointments can be challenging in part due to the anxiety-provoking encounter that medical appointments and procedures can induce. To support an improved experience, the team conducted a review of literature related to children's preferences in healthcare environments. This revealed that children relate and understand their environments in a rather sophisticated manner. In the design of the new Specialty Care Center, the team developed design strategies that moved beyond creating simplistic, static visual environments to creating dynamic environments that engage multiple age groups. The Specialty Care Center design is based on the theme of 'imagination and discovery'; focusing on opportunities to play, socialize, fantasize, explore, and experience.

Solution: Integration of color, finish materials, and graphics are designed to support the theme and allow children to interact with their environment. Upon arriving at the Specialty Care Center, each child is given a special "passport" on which they receive destination stamps as they "travel" to different departments throughout the building or undergo tests, scans, or procedures, transforming a potentially frightening experience into one with elements of surprise and delight.

To inform design decisions, the team surveyed clinical leaders in each of the different clinics to better understand how treatments, therapies, and procedures impact how children are physically positioned during an appointment, procedure, or therapy session. Engaging clinicians early-on in the design process can help inform how the built environment can go beyond providing positive distractions to become a tool for clinical and therapeutic care. Findings informed the placement of graphic elements on the walls, ceilings, and floors to provide positive distractions in the most effective locations.

Additionally, the built environment provides benchmarks and milestones in therapy areas – for example, graphic elements in the flooring can be used to work through mobility issues. Iconography used throughout the center helps aid way-finding to different clinics while flooring patterns and



EBD Goal:

To address the need for outpatient pediatric services and to continue the brand of an integrated experience on the main hospital campus as a convenient alternative to the disparate outpatient locations available to parents.



Small: St. Louis Children's Specialty Care Center - Imaging
Main: St. Louis Children's Specialty Care Center - Lobby
Alise O'Brien Photography, June 2015

graphics help patients and families navigate independently through the clinics themselves. Graphic elements used on the walls serve an educational function and are often accompanied by narrative text that depict stories of the region.

Results: The new facility opened in June of 2015 and is receiving positive anecdotal feedback that indicates the design solutions have been successful. Research and inquiry techniques used in the design process are being replicated in new inpatient projects taking place at SLCH's main campus. The hope is that this will translate to a similar experience across SLCH's sites reflective of their mission – "Doing What's Right for Kids".

EBD STEPS APPLIED:



Overview: Continual growth and increasing patient volumes at Akron Children’s Hospital drove the development of an extensive campus master plan with aggressive future growth strategies. In 2012, Akron Children’s announced a \$200 million expansion to meet the current and future needs of children in northern Ohio and their families: the Kay Jewelers Pavilion, a 368,735-square-foot critical care tower. The seven-story Kay Jewelers Pavilion at Akron Children’s completes the first phase of the master plan.

Challenge: In addition to the four 25-bed neonatal intensive care units, the new critical care tower is comprised of: a special delivery unit for high-risk babies that includes labor, delivery, recovery, and postpartum (LDRP) rooms with connected cesarean-section and fetal operating rooms; an emergency department consisting of 31 exam rooms, five behavioral health rooms, and three trauma rooms; a new outpatient surgery center with eight pre-operative rooms, four operating rooms, and space for two more in the future; and an enclosed concourse taking patients and staff members from the 1,250-space garage to the new critical care tower and existing hospital.

The challenges specific to the design and operation of the neonatal intensive care unit, included adaptive learning; working efficiently and effectively with a new workflow, garnering support services involvement, standardizing rooms across the units and within the support cores, and providing appropriate and separate space within the patient room for family activities.

The workflow transition from six-bed pod arrangements in the existing NICUs to the new all-private patient room units caused the greatest amount of uncertainty with the staff. They were concerned that the new design would not allow similar access, visibility, and ability to communicate with families they had when working in the multi-bed pods. The perception many of the nurses and physicians had about increases in travel distances added to the challenges to overcome.

Solution: Testing scenarios and running various simulations in the full-scale mockup of the NICU relieved many of the uncertain perceptions staff members had about the transition and revealed refinements that enhanced the design of the units and individual rooms. Additional strategies developed by the team included: nurse charting alcoves outside every room (response to visibility); high noise-reduction coefficient (NRC) ceiling tile in patient rooms and corridors (response to noise); a separate family zone within the room (response to family activities in the room); and family nourishment/lounge spaces on the unit (response to family activities in the room).

EBD Goal:

To implement all-private patient room units (with the exception of enlarged rooms for twins/multiples); provide clear visibility and direct line of sight to all patients; increase privacy and offer greater support for mothers to nurse and have “kangaroo care” time with their newborns; improve family and nurse/physician communication; and reduce overall noise levels on the units.



Akron Children’s NICU Private Room, Blake Marvin/HKS, Inc.

Results: The unit opened in May, 2015. It is crucial to thoughtfully prioritize and plan key EBD goals and objectives from the start, in order to successfully realize the many needed fundamental design concepts. If the effort to critique the initial brainstormed list of EBD goals and confirm the appropriateness to meet the unique aim of the NICUs had not been done, the design would have suffered, as the concepts would have been too broad.

With the aim clearly determined, the design developed and evolved naturally to resolve and address each goal established at the onset. The “icing on the cake” will be to conduct a post-occupancy evaluation to validate the effectiveness of each design strategy and the overall design solution against the project goals. Two studies are underway — one on the Lean integrated project delivery (IPD) system, which has shown considerable cost savings using a collaborative process, and another on staff engagement during the transition process.

Healthcare Art Consulting LLC

Charleston Area Medical Center Cancer Center
Charleston, WV

EBD Goal:

To bring the local West Virginia community together and fulfill Charleston Area Medical Center's (CAMC) healing vision for their Cancer Center by bringing the outdoors into their environment.



Top: Second Floor Overview – Ashley Taetz, 2015
Bottom: Season of Hope – Jonathan Cox, 2015

EBD STEPS APPLIED:

1

Overview: The Charleston Area Medical Center (CAMC) Healing Arts Program was the result of the community's capital campaign project: "Power of Many". Healthcare Art Consulting and CAMC built the program to create a healing journey from the lobby, through the hallways, and into the treatment areas.

Challenge: The first step of the process started by forming a diverse community-based Healing Arts Selection Committee comprised of cancer survivors, local business leaders, art philanthropists, and caregivers. Next, the project team that included the CAMC Foundation, construction project management, an art consultant, an interior designer, and the Healing Arts Selection Committee identified specific locations for each art installation. The challenge was engaging the community and creating a clear message to artists about the hospital's vision and needs.

Solution: Healthcare Art Consulting, along with the CAMC Health System, promoted a statewide "call to artists". Blind submissions were reviewed to narrow the selection of artists. After artists were confirmed for contention, Healthcare Art Consulting worked with each artist to provide the program vision, interior finishes, and space specifications to inform their design ideas for commissioned artwork. All design ideas were presented to the Selection Committee for final selection of the winning design concepts. For six months, Healthcare Art Consulting coordinated with the artists, construction project management, and the Healing Arts Selection Committee to oversee fabrication and production of site-specific works of art created for the CAMC Cancer Center. From coordinating wall blocking, lighting, and framing, to installation hardware, the artists collaborated with the project team to finalize the final art installations.

Today, CAMC contains twelve commissioned works of art created by seven artists whose styles are diverse art mediums (glass, wood, oil painting, photography). Designed to enhance the environment of care and reflect the diversity of the communities which the 100,000 square foot CAMC Cancer Center serves, the art evokes messages of hope and healing for patients, visitors, and staff. Each piece has deeper meaning because each artist has a connection to West Virginia and cancer.

In addition to the twelve commissioned works of art, over 200 photographs of healing nature images were installed in patient treatment areas and staff workspaces to contribute to the overall mission of the healing arts program. The end result is a healing environment that reflects the vision of the "Power of Many".

EBD STEPS APPLIED:



Overview: East Morgan County Hospital (EMCH) is a critical access hospital. This was an expansion project to support the growth of this rural community.

Challenge: The existing kitchen and dining space was remotely located from the main entrance, had limited natural daylight, and was too small. EMCH's vision was to create a welcoming space that would provide respite from the stress that patients and families encountered and a place for staff to recharge during breaks. The kitchen staff needed an efficient space to support food preparation and serving without workarounds or bottlenecks and adequate space with clear separation of food preparation and cleaning functions.

To identify user group goals and work towards a solution, the team realized that looking at spaces two-dimensionally was difficult for staff to visualize and hindered their engagement in decision-making. An alternate means for confirming and testing design concepts was necessary to gather input and gain buy-in.

Solution: In the early design phase, Davis Partnership referenced literature for optimizing the seven flows in healthcare environments and applied them to kitchen and dining settings. Additional research on the stress-reducing benefits of nature views became a guiding principle for the project. The initial plan, created with the kitchen staff's input, was analyzed against the seven flows and showed major flow conflicts.

The team used Rapid Prototyping to aid the staff in visualizing and understanding departmental flows. This event included the interdisciplinary team: kitchen staff, supply chain staff; community members; hospital and Banner Health management teams; care providers; and design, engineering, and construction team members. There was one simple ground rule: everyone had an equal voice in the process. This was an excellent tool for "just-in-time" research, when published research is lacking to quickly inform design.

Over two days, a full-scale cardboard mock-up was built so the users could role-play, examine inefficiencies, and easily make adjustments in real time. The mock-up was continually manipulated until the efficiency goals and ideal staff and visitor flows were achieved and agreed upon by all participants.

The solution is an open dining area that is parallel to a galley-style kitchen. A serving counter runs lengthwise between the spaces bringing them together visually, while maintaining a distinct separation for streamlined "onstage and offstage" flow. No cross-traffic allows visitors to enjoy a peaceful, comfortable dining experience. The kitchen is organized for optimum

Davis Partnership Architects

East Morgan County Hospital Kitchen and Dining

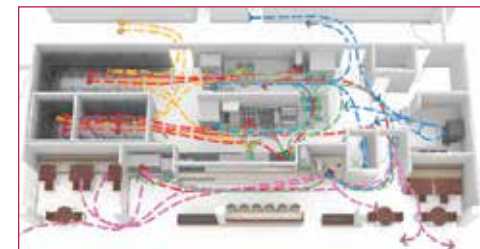
Brush, Colorado



EMCH Kitchen, Paul Brorkering, May, 2015

EBD Goal:

To create a dining area that would serve as a hub in the local community, with an adjoining kitchen designed for peak efficiency.



Left: "Current State" Kitchen and Dining Flows Before Rapid Prototyping, Right: "Future State" Kitchen and Dining Flows after Rapid Prototyping
Davis Partnership Architects, March 2014

efficiency with clean storage on one side and dishwashing on the other with dedicated entry points for these functions to eliminate bottlenecks and possible cross-contamination.

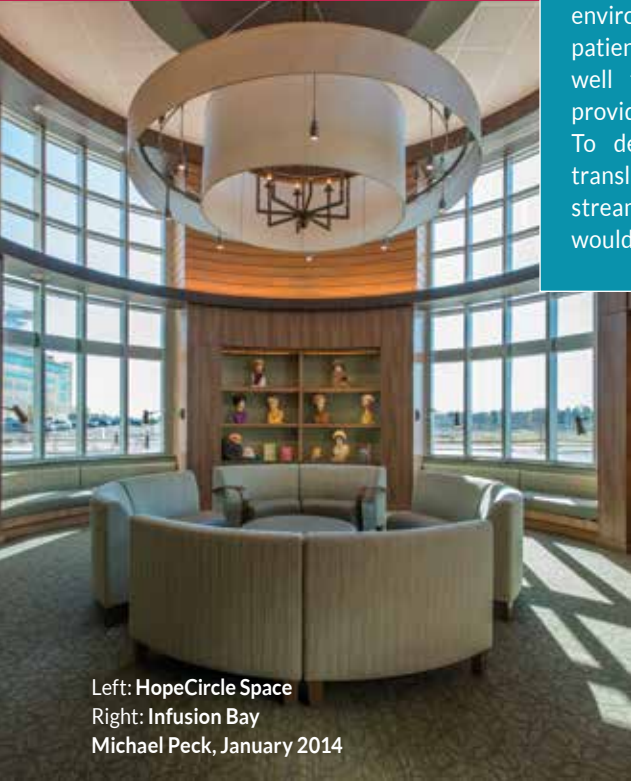
The spacious dining area is flooded with natural light with views of the outdoor patio and garden, easily accessible from the main hospital entry and nursing unit. Patients, family members, staff, and even general community members use the new dining area as if this space always existed as the heart of the community.

Earl Swensson Associates – ESa

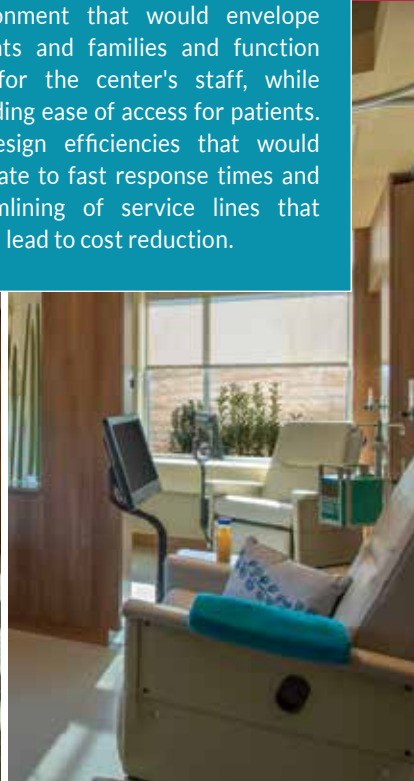
NEA Baptist Cancer Center/Fowler Family Center
for Cancer Care
Jonesboro, Arkansas

EBD Goal:

To create a soothing, comfortable environment that would envelope patients and families and function well for the center's staff, while providing ease of access for patients. To design efficiencies that would translate to fast response times and streamlining of service lines that would lead to cost reduction.



Left: HopeCircle Space
Right: Infusion Bay
Michael Peck, January 2014



EBD STEPS APPLIED:



Overview: The first of its kind in the region, the 32,873 square foot cancer center provides state-of-the-art radiation therapy, chemotherapy, clinical research, and support services. Twenty chair infusion pods are in a spa-like environment overlooking an outdoor healing garden. Radiation oncology is equipped with a linear accelerator and a CT simulator. On-site clinical research space allows patients the opportunity to participate in cancer research studies. HopeCircle, unique to the NEA Baptist Cancer Center, is a free NEA Baptist Charitable Foundation program that supports patients and families with cancer.

Challenge: One-size-does-not-fit-all for every patient cancer treatment and care. Some cancer patients prefer privacy regarding their conditions and during treatments, while others want to socialize for support.

The achievement of privacy, while maintaining flexibility of openness for socialization was a challenge in the overall design of the facility for the design team. Particularly challenging was providing both options for the 20 infusion bays.

Solution: Having a freestanding cancer care center on the medical campus allows cancer patients, whose immune systems are compromised, to have a private experience that is away from transmission of possible viruses or other illnesses that might be associated with the campus hospital and clinic. Parking is near the front door for easy navigation.

To offer treatment privacy, the interior design team custom designed floor-to-ceiling cubicle curtain storage within cabinetry that separates chemotherapy infusion bays, which are in pods of five. When patients want privacy during infusion, the side door on the cabinetry in each bay can be opened, and the curtains pulled out and across to conceal the patient. The infusion lounge chairs are equipped with small monitors, empowering patients with control to watch their choice of television shows, should they not desire to socialize with other infusion patients.

When not in use, the cubicle curtains are out of sight. Openness between the bays then allows a sense of community among the patients. For optimal light transfer, aesthetics, and a connection to the regional area, translucent 3form panels in the cabinetry encapsulate indigenous plant life.

These 3form panels with alternate open spaces are also included in the nurse work areas. The infusion chairs back up to these panels. This allows the nursing staff to watch patients during the infusion process and still provide them a sense of privacy.

The space for HopeCircle anchors the front of the center and is rounded and immediately adjacent to the lobby waiting space. Extensive programming for the space yielded boutique shelving for the display of wigs, scarves, and multiple reference sources. With sensitivity to the patient experience, evidence-based design concepts helped influence the project's design to include natural light throughout the facility, spaces focused on patient and family-centered care, and human touch and interaction.

Results: In the first year, patient satisfaction scores rose to an unprecedented level, to the 73rd percentile in the nation when compared with other cancer centers. The scores of the previous location were below 50. Additionally, staff report increased visits to the HopeCircle area because it represents a calm haven next to the lobby waiting area.

EBD STEPS APPLIED:



Overview: Applying the evidence-based design process, CAMA, Inc. determined a need for family to physically connect with a bed-ridden hospitalized loved-one. Unable to find a product on the market, CAMA partnered with IOA Healthcare Furniture to develop, test, and bring to market a new category of healthcare furnishing and designed the Family Bed Chair. The chair would be used by family members and adjust to hospital bed height promoting eye-to-eye contact and hand holding.

Challenge: The challenge was for a design firm to engage with a manufacturer in product design. The concept came primarily from parents interviewed for the numerous pediatric facilities CAMA has designed. Existing products with similar function were identified but none met the needs.

After reviewing numerous sources for relevant evidence, the idea was presented to the manufacturer and design work began. The healing power of touch is an outcome that has not yet been fully explored in acute care interior design. While numerous studies confirm many therapeutic benefits associated with touch, including reduced stress, improved sleep, improved memory, and improved pain management, Western medicine has been slow to harness its healing powers.

The team's hypothesis is that physical touch will improve the state of wellbeing for a bed-ridden patient and reduce stress for a concerned loved one. Healthcare designers understand the positive impact of social support on healing and plan for it superficially with the addition of furniture, typically chairs, to clinical and recovery spaces. Rarely do healthcare designers dig deeper and explore how the built environment can encourage actual physical touch between patients and loved ones, patients and caregivers, and even from caregiver to caregiver. Yet this subtle shift in thinking may significantly transform healing spaces.

The engineering trials were the most challenging. Creating the right prototype took hours in the factory with skilled labor, engineering know-how, and a design that would make a difference to an interested population. Market studies were conducted through a series of fact-finding demonstrations with a variety of stakeholders and focus groups. Their critical analysis was brought back to the drawing board and then retested in the field. Several iterations of this process occurred across a geographically diverse area giving the team the necessary feedback to deliver a product that would improve healing.

After the consumer focus groups were satisfied, the product underwent performance testing to meet industry standards for safety and lifecycle

CAMA, Inc. and IOA Healthcare Furniture

Cama Healing Touch Collection – Family Bed Chair
Thomasville, NC

EBD Goal:

To harness the healing power of touch between a bed-ridden patient and a concerned loved one in order to promote healing.

A Family-Bed Chair – IOA Healthcare Furniture/Douglas Milloway



requirements for healthcare. Although a different process from building architecture, the evidence-based process was remarkably the same and a great example for mitigation of the risks in innovation.

Solution: Family Bed Chair: a new category of furniture that is not a recliner or a sleep chair in the traditional sense; it is an articulating chair intended for family, not the patients. It has three applications: “eye-to-eye”, where patients and family both can engage with clinicians sharing critical medical information; “tête-a-tête”, where patient and family sit head to toe for sustained eye contact ideal for periods of wakefulness; and “lullaby”, where patient and family lie head to head for reading, watching television or computers together, or sleeping.

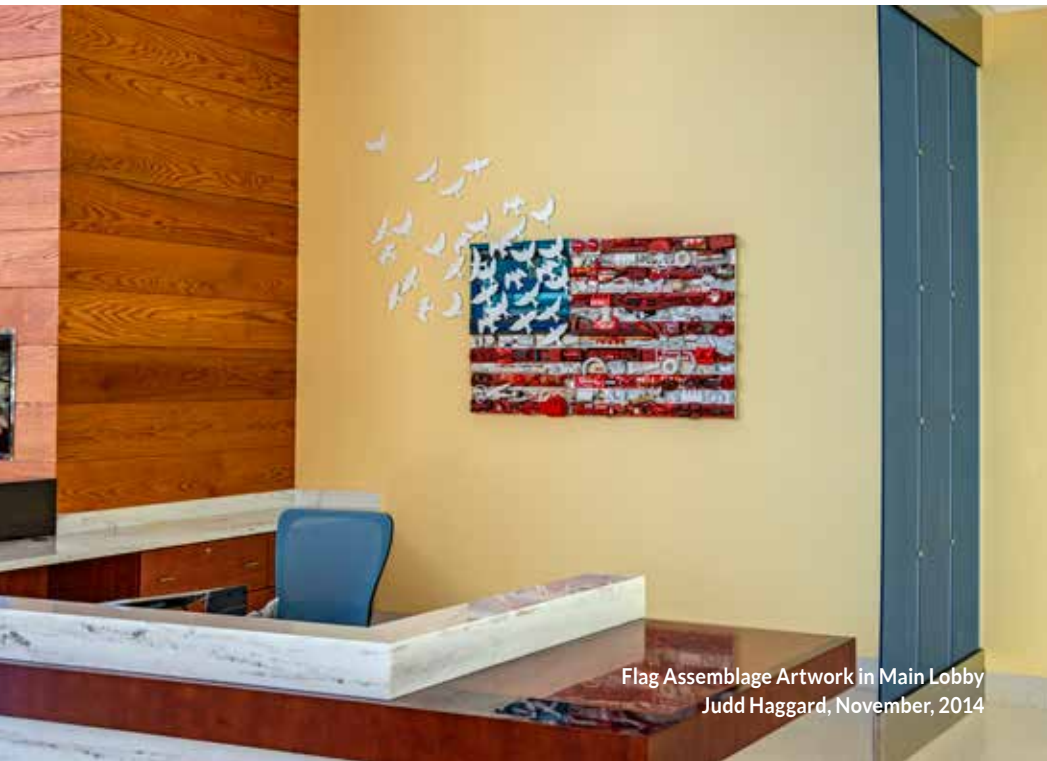
The chair will be offered in Fall 2015 and other pieces will be added to create the Healing Touch Collection.

Skyline Art Services

Martin Army Community Hospital
Fort Benning, GA

EBD Goal:

To combine two sometimes-competing objectives: to offer positive distraction for patients with proven EBD principles, while honoring the mandates of the U.S. Military's visual culture. Cultural specificity in this case meant incorporating subjects, styles, and media not commonly associated with evidence-based design.



Flag Assemblage Artwork in Main Lobby
Judd Haggard, November, 2014

EBD STEPS APPLIED:



Overview: The Military Health System officially adopted evidence-based design principles nearly a decade ago. Stakeholders at Martin Army Community Hospital also expected to see an environment with visual clues specific to military service and sacrifice, honoring patients and their families with patriotic reminders of their attachment to the nation, the army, and even their regiment. The art program embraced both directives.

Challenge: The symbols and motifs that signify honor, patriotism, and pride include eagles, historical photography, military insignia, and even representations of maneuvers in field training. The hospital's design team defined the evidence-based design art elements to include references to nature, a variation in media and scale, and opportunities for positive distraction. These ideas were initially questioned by end-users. Material preliminary concepts were presented in person to be better understood and to gain acceptance.

Solution: It was decided to place the most literal and patriotic subjects in the public and entry spaces, reserving calming and nature-based imagery for interior spaces, where patients would come into contact with their healthcare providers. The design solution hypothesizes that incorporating elements that reflect a specific visual culture — even if not commonly understood as healing art — may support healing and promote a sense of wellbeing for those who belong to that culture.

Accordingly, the most acclaimed component of Fort Benning — its jump-towers for training paratroopers — were presented as the predominating subject within the main atrium, complete with parachute treatments for the overhead lighting. Other areas featured historical memorabilia, photography of active service, and references to specific divisions and units housed at Fort Benning. Using data offered by end-users, refinements to art selection, location, and graphic design were made. Elsewhere, artful references to local flora and fauna are presented through a variety of media.

Results: Patient-centered design requires specific solutions to specific settings, particularly when patients belong to a highly distinct culture, with its own visual vocabulary. EBD precepts, as commonly understood can make room for other subjects and meanings. Further research is needed to test the hypothesis that a healing art program may incorporate elements not yet associated with EBD art. In addition to references to nature, variation in media and scale and opportunities for positive distraction, a visual art program may offer encouragement through proud affiliation, honor, and recognition of service.

EBD STEPS APPLIED:



Overview: Family Healthcare of Hagerstown, a federally qualified healthcare center (FQHC), was formerly known as the Walnut Street Community Health Center and had outgrown their leased space within a multi-tenant building. The board made the decision to renovate an existing building in order to create a state-of-the art outpatient healthcare center where patients can access multiple services at a single location. This move to a new, highly visible site in a larger building was necessary to serve their growing patient population and implement a patient-centered medical home model.

Challenge: Driven by the deadline of their expiring lease, the timing of the available property, and the schedule of time needed to explore potential project partners, the decision was made to use an integrated project delivery method. The budget also had to absorb the purchase of the building, design, construction, furniture, fixtures and equipment, in addition to the cost of the move from their existing facilities into the new building.

The organization purchased a property with the hope that much of the existing infrastructure and exterior skin could be reused to support their new build-out. As the planning and design work began in coordination with selective demolition work, it became evident this goal would not be achieved, due to prior vandalism of wiring and a compromised exterior that had suffered water damage. Additionally, building codes were not met by some existing features, requiring the team to work with authorities to find solutions. The team responded to the existing building's challenges by assessing the costs of repairs and replacements, and bringing that knowledge into the project scope.

The owner insisted the design team recognize and respect the center's patients and their families and wanted the final design aesthetic to achieve a balance between a clean, modern and professional image without being too extravagant in spite of budget constraints and the unique challenges.

Solution: The design organized clinics around an integrated care team solution offering an on-stage / off-stage approach to the functional operation. Each clinic pod (two per floor) has a common core of integrated exam rooms (between behavioral health, consultative and medical/clinic), accessible from the main lobby. The "front" of each pod has an integrated care team space and provider work space. Support functions are located toward the back in a common core area shared between two pods. Patients and their families are received on the main floor where registration, financial, social consultative services, and laboratory/testing services are located along with a retail pharmacy. Patients can register in person or at a kiosk and are then

EBD Goal:

To create a best-in-class patient-centered medical home model, while overcoming the challenges of rebranding and relocating the organization into a new location in renovated space.



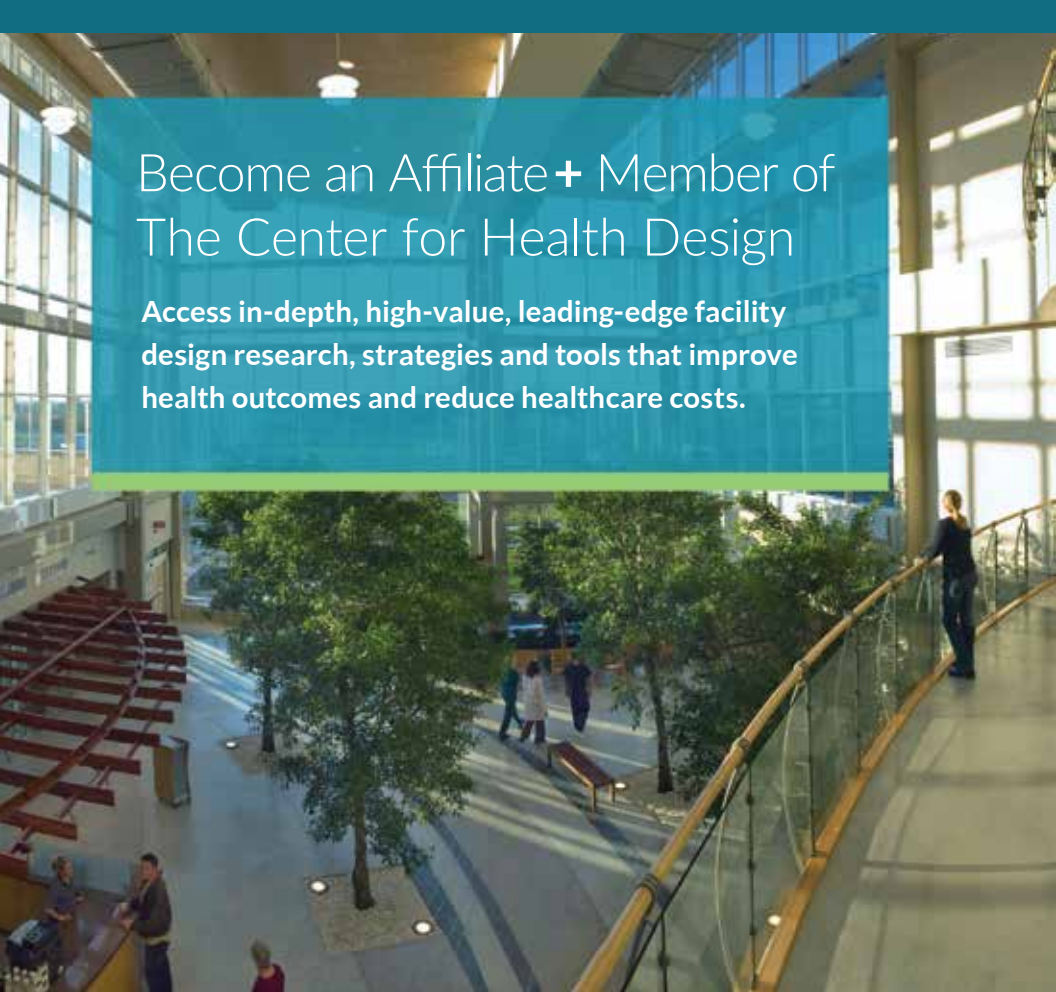
Family Healthcare of Hagerstown Reception
Andrew Harris/ERDMAN, August 2015

moved to the clinic or dental pods located on the second, third or fourth floors. Each floor and pod is color-themed to assist with wayfinding.

Administration and staff support spaces are located on the fourth floor, which includes a large staff room and break area that can also be utilized for patient and family group therapy and educational sessions.

Results: This project was developed with several metrics for measuring success, including growth in revenue and patient panels, increased patient and staff satisfaction scores and rate of retention, and ERDMAN's ability to deliver the project at or below budget.

The resulting clinic is an integrated patient-centered medical home model that provides behavioral health, family practice, and dental services. These services are organized in a vertical solution to fit the available floor plates of this existing building. The project team will measure outcomes based on the stated goals and objectives as part of an evaluation to follow at one year, three years, and five years after occupancy (occupancy was July 2015). The new facility balances the need to serve their growing patient population affordably with a patient-centered medical home model in a respectful and attractive space.

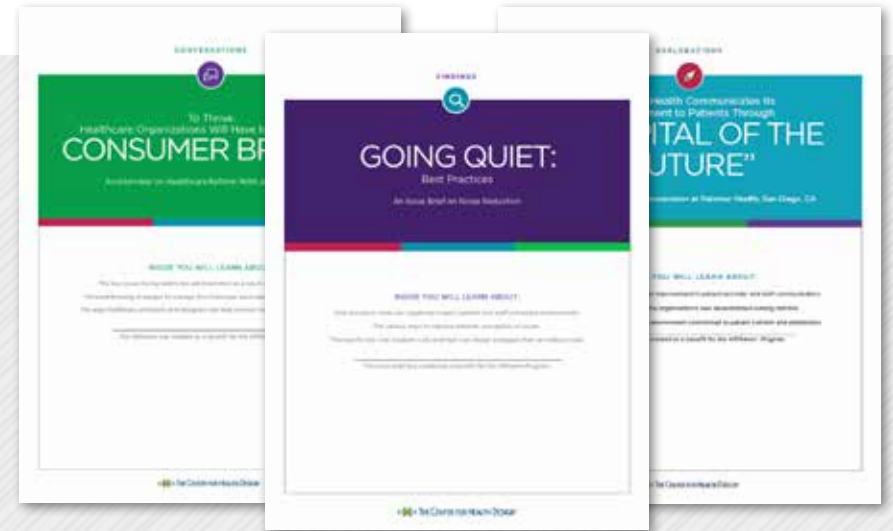


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