Become EDAC accredited. Join our growing list of Advocate Firms.

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

Since its launch in 2009, over 500 individuals worldwide have obtained the EDAC credential. There are currently 24 industry organizations endorsing the program: Champion Firms participated in the EDAC examination beta testing phase in early 2009; Pebble Project Pioneers and Advocate Firms commit their staff to completing the exam.

In this booklet, Champion and Advocate Firms highlight how they are using EBD in their projects. The EBD 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

Visit www.healthdesign.org/edac for more information, and contact The Center for Health Design at 925-521-9404 to become our next Advocate Firm.
Educational Partner:
Nurture by Steelcase

Champion Firms:
Kahler Slater
Harley Ellis Devereaux
Cannon Design

CAMA, Inc.
American Art Resources
Salvatore Associates

Advocate Firms:
Gresham Smith & Partners
HDR Architecture
B+H+STH Architects
CEI Architecture
Peters Associates
czopek & erdenberger
CBLH Design
Anshen+Allen, a part of Stantec Architecture

Wellness Environments
Stantec Architecture
Gensler
Healthcare Art Consulting, LLC
Visions in Architecture
Kasian Architecture
JAIN MALKIN, Inc.

Pebble Project Pioneers:
Provincial Health Services Authority
WellStar Paulding Hospital
Step 1: Define EBD Goals and Objectives

Goal:

The design of the new Nanaimo Regional General Hospital (NRGH) Emergency Department would be guided by the following four values: timely, respectful, quality care, and a place where people would want to come to work.

Challenge:

As the design evolved, and functional adjacencies were being satisfied, a focus and desire arose by the users to take it beyond a functional, and efficient ED; the users wanted to create a place where people would want to come to work. This goal could be demonstrated and supported by creating an environment that provided natural light and adequate staff work, personal and lounge/respite areas; with views to nature. The design solution imbedded five courtyards. The challenge was to demonstrate to the client/owner that there was not a premium in the net-to-gross, additional floor area, excessive travel distances, and/or additional capital costs being generated as a result of the preferred solution. The team provided a convincing argument about cost/benefits of this solution and produced a LEED gold building, on budget!

Solution:

The team confirmed that NRGH would use Functional Program parameters, room and component areas similar to other recently built EDs, and that the design achieved equal or more efficient gross up factors than comparison EDs. The solution was designed to provide daylight and views to staff work and patient care areas, in response to the clinician generated body of evidence of the benefits of daylight in healthcare facilities.

We concluded that a conservative 1.5% overall productivity gain would be required to achieve a three year payback for the courtyards and related capital costs. This project has started construction and tendered under budget.
HDR; Ft. Belvoir Community Hospital, Ft. Belvoir, VA
Step 1: Define EBD Goals & Objectives
Step 2: Find Sources for Relevant Evidence

Goal:
Create a patient- and family-centered environment, improve the quality and safety of healthcare; enhance care of the whole person (contact with nature and positive distractions); create a positive work environment; design for maximum standardization, future flexibility and growth.

Challenge:
The Ft. Belvoir Community Hospital (1.2 million SF) was the first DOD/Military Health System (MHS) project to use evidence-based design (EBD) in a structured manner, as mandated by the DOD in 2007. Additionally, the Defense Health Board mandated that all MHS facilities be built as world-class facilities, a term that had yet to be defined. The first MHS EBD checklist was developed to assist the design team in understanding and tracking each element.

The main challenge was that the square footage and budgets for DOD/MHS projects were already set and some of the EBD or sustainable elements were not included, planned or budgeted.

Solution:
Because HDR had strong champions who understood the importance of all of these features, the team was able to continually educate the remaining team members, and provide credible research to those who continually tried to value-engineer products or designs. The team prevailed and was able to provide most of the elements of a world-class, healing environment based on EBD and sustainable concepts. In addition, when complete, the project will be LEED Silver and may possibly achieve LEED Gold.
Step 2: Find Sources for Relevant Evidence

Goal:
This project involved the renovation of the existing Adler Building with a new entry addition to create an identifiable and convenient birthing center with all services in one building. Team members used the Evidence-based Design Checklist Tool developed by the Military Health System to identify over 20 design goals, these included increased social support, increased bedside time, decreased stress, and improved communication.

Challenge:
Literature informed many design decisions. The team desired additional data so other data collection methods were utilized. Pre-design surveys were completed by staff members and physicians to understand their vision for the new women’s center and perceptions of current work environment attributes. Three team members completed several hours of nurse shadowing to gain greater insight into staff operations. Team members, including some physicians, toured four women’s centers, which afforded the opportunity to see design innovation in practice, as well as talk with clinicians about their processes. Prior to selecting the sites, benchmarking data were collected. Additionally, hospital staff interviewed 70 post partum patients and 30 parents of NICU babies, and process mapping helped staff members optimize clinical processes.

Solution:
The final design was a patient and family centered women’s center with a distinct family zone in each patient room. The neonatal intensive care unit (NICU) design boasts all private rooms to provide greater control over ambient conditions and to increase privacy for breastfeeding and kangaroo care. A healing garden with sibling play area will provide a positive distraction to laboring moms, family members and staff, providing access to the soothing power of nature.
Anshen+Allen; Laguna Honda Hospital and Rehabilitation Center, San Francisco, CA
Step 2: Find Sources for Relevant Evidence
Step 3: Critically Interpret Relevant Evidence

Goal:
To identify built “centers of excellence” that best represent evidence-based design (EBD) and eco-effective design (EED) innovations.

Challenge:
The team started by reviewing “best of” lists of healthcare facilities, however these articles seemed anecdotal. To create a credible list the research team used a multi step process to ensure due diligence. Phase one entailed interviews with internal advisory groups to identify names of national EBD and sustainability experts, and facilities they deemed as “centers of excellence”. Findings were used along with a literature review. Results were compiled and sent to the national experts who were asked to identify the Top Ten built facilities in North America representing best practice in either EBD or EED hospitals. From the survey a list of “centers of excellence” was developed identifying possible respondents to interviews and surveys about the design strategies implemented in their facilities.

Solution:
The EBD and sustainability experts identified 9 EBD and 9 EED facilities representatives of best practices in each subject area. The research team contacted 8 administrators from each facility type to interview and survey. (Full methodology and findings are available in the 2009 article in Health Environments Research and Design (HERD).

The final analysis of the data collected from the survey influenced the creation of our Integration Matrix. This matrix helped us to isolate a set of “always events”, 10 best practices for both areas (EBD and EED) with strategies that can be implemented without compromising one another.
CANNON DESIGN; Northwest Community Hospital, Arlington Heights, IL
Step 3: Critically Interpret Relevant Evidence
Step 8: Measure Post-Occupancy Results

Goal:
The project established four guiding principles: Design for adaptability to enable flexibility of use over time; Incorporate safety initiatives identified in available research; Create standardization of processes, supplies and design to develop a safer environment and increase the value of the facility; Develop archetypes or prototypes for all components including design elements, patient rooms and overall units.

Challenge:
To demonstrate the true benefit of a given design approach. Based upon available evidence, hospital administration charged the team with demonstrating value in their solutions. Staff had difficulty envisioning change within their workspaces, and many had not experienced working in other facilities so it was challenging to show how the space would function by using plans and elevations.

Solution:
Through a series of mock-up and simulation modeling, the team developed prototypes to be used for all inpatient units. Results: Increased Press Ganey scores of 14.5% for “willingness to recommend” and increased recruitment of OB/GYN physicians. Operational improvements from decentralized medication distribution to the bedside, patient safety standardization, inventory cost control for non-chargeable items and a 50% increase in square footage with no increase in the number of FTEs.

Balconies have approximately 270 visits/month/floor and provide a place for the pilot horticultural therapy program. Elimination of double-door access to patient rooms yielded a net savings of $400,000. Analysis of flooring products resulted in 15-year lower life-cycle costs. Private rooms increased occupancy from 64% to 86%.
Step 4: Create & Innovate EBD Concepts

Goal:
Receive feedback from stakeholders in order to determine appropriate artwork styles, themes and color palette; Recommend plan for selection of artwork for areas within Outpatient and Inpatient areas based on feedback from end-users; Publish focus group survey results for other Baylor Health Care System cancer dedicated facilities in order to create a systemwide artwork program.

Challenge:
Obtaining pool of participants that proportionately represented patient and staff populations of facility and community.

Solution:
Highlight of interesting results: Overall survey results showed that participants preferred landscape scenes of nature with calm bodies of water and cool colors (i.e. blue, aqua, and green tones); Upon review of participants by county, counties north of Dallas county preferred the impressionistic art style and landscape scenes depicting images outside the regional area; This project is not complete and post-occupancy surveys will gathered. HAC believes in sharing our resources to improve the evidence-based design body of knowledge. The art survey is available to others for research projects.
HOK; Jain Malkin, Inc.; Based on the Raj & Indu Soin Medical Center, Beavercreek, OH
Goal:
To include as many features as possible which would help influence positive patient outcomes. EBD features were developed through programming and visioning sessions with the executive team and user meetings, and priorities were established with them in relation to the budget and the desired patient centered experience.

Challenge:
The multidisciplinary team was committed to create and innovate design concepts. The challenge was to convince the team of the importance of constructing a mock-up room. It was suggested to create a mock up room as early as possible to allow for its evolution from cardboard during the schematic design phase to the use of actual finishes, furniture and full fit-out during the construction documents phase.

Solution:
The following design concepts were implemented:
1. Highly visible clinical handwashing sink.
2. Hand gel dispenser at entry door inside patient room.
3. Positive distractions placed in view of the patient; i.e. artwork, plant shelf, TV.
5. Family zone, including sleeper sofa, desk, and wardrobe cabinet.
6. Large expansive views of nature.
7. Acuity adaptable rooms.
8. Identical room orientation, all caregiver approaching at the patient's right side.
9. Inboard toilet nearest the patient at the headwall.
10. A barrier free toilet room and shower.
Step 4: Create & Innovate EBD Concepts

Goal:
To create a project structure and process that utilized an interdisciplinary design team (IDT) and supported the integration of Environment of Care (EOC) components to develop concepts for the ED design. The project incorporated evidence-based design (EBD) strategies to improve the patient experience and throughput while maintaining the highest quality of care and safety for the patients and staff.

Challenge:
Accepting a different project delivery system for a project with a tight budget and an aggressive timeframe is difficult. The challenge was to present the benefits associated with the change in process such that they would outweigh the perceived risks associated with the proposed change.

Solution:
The Project Organization and Process Diagram identify the resulting structure that was designed for this project. The Decision Review and Approval Committee (DRAC) established the guiding principles, design guidelines, and the criteria for evaluation for the project. A subset of that group became the Project Oversight Group (POG) and had a more direct interaction with the IDT and reported back to the DRAC for final review and approvals as appropriate. Six interdisciplinary work groups were formed to address the Environment of Care Components relative to this project, and met regularly in the early phases of the project. The IDT, using the work group information to inform the process, developed options for consideration that were held up against the criteria for evaluation. These options would return to the IDT for further study and development until they either met the criteria previously defined or the previously defined criteria had to be modified given the alignment of the options with other project considerations. Once the chosen option met the identified criteria it was approved for implementation.
CAMA, Inc.; Smilow Cancer Hospital at Yale-New Haven, CT
Step 5: Develop a Hypothesis

Goal:
Promote the healing process for the patients of Simlow Cancer Hospital by using the evidence-based premise that appropriate art has the power to lower stress, anxiety and pain, as well as increase patient satisfaction through the improved perception of the quality of care delivered.

Challenge:
Roger Ulrich’s landmark study, “View through a window may influence recovery from surgery” in Science Magazine (1984) set the tone for an understanding of the effects of nature on improved health outcomes. Subsequent research cemented that long views of nature improved outcomes, where abstracted subject matter did not (Ulrich, Lunden, Eltinge 1993). In all patient areas on this project, art with a strong connection to nature was selected following guidelines from Ulrich and Gilpin’s Healing Arts: Nutrition for the Soul (2003). One of our challenges was determining the appropriateness of abstract art that referenced nature. We permitted these types of abstractions in more public areas if they met the standards set forth in our vision and mission.

Solution:
Cynthia Packard’s Dahlias is a warm vivid connection to a traditional gesture of endearment for women, an example that is in line with Ulrich’s category of flowers and gardens. In the mezzanine café, which overlooks the main lobby, there is a Sol LeWitt donation from the University Gallery. The subject matter is quite contrary to all research, but offers dimension behind grid and the textural paint finish adds variability found in nature so noted in E.O. Wilson’s research about Biophilia. It sets a bright and colorful tone for all of the artwork selected and complements the neutral building scheme.
Step 5: Develop a Hypothesis

Step 6: Collect Baseline Performance Measures

Goal:
To clearly define a hypothesis that provided focus to research efforts and clear direction for the design of new Specialty Outpatient Clinics (SOCs) at the new Medical Centre of the National University Health System, Singapore.

Challenge:
The project goal of embedding medical education and research within clinical outpatient setting generated a host of research opportunities. These included observing the current undergraduate and post-graduate educational experiences, student, physician and nurse interviews, and rapid prototype modeling of the consult room (exam room) design. Initial observations yielded many possible areas of improvement: nurse workflow, storage, hand washing, room size, faculty-student interaction, family involvement, patient privacy, length of exam, etc. While all these impacted design, a hypothesis that would prioritize the most important improvement strategies was needed.

Solution:
Though a discovery process it became clear that the main driver of the project was the redesign of the medical education curriculum for the new ambulatory setting. Therefore, Kahler Slater developed a hypothesis to focus on improved teaching and learning outcomes as well as enhanced patient care: Teaching hubs adjacent to the consult rooms in the SOCs will improve the patient experience, enhance the learning experience and increase mentoring opportunities.

This hypothesis directed Kahler Slater’s research activities on both physical and operational factors relating to learning and patient care in the SOCs. This resulted in the design of an innovative space - the teaching hub – which has become a key design feature in the project.
Visions in Architecture; Butler County Health Care Center, David City, NE

Patient Room Floor Plan
Step 5: Develop a Hypothesis
Step 7: Monitor Design & Construction
Step 8: Measure Post Occupancy Results

Goal:
To renovate two fifty-year-old patient wings into private rooms in a cost effective way for Butler County Health Care Center. The hypothesized outcomes resulting from the patient room design interventions included fewer patient and staff falls and favorable patient satisfaction scores.

Challenge:
With the existing structure, there was very little room to create safe and accessible patient rooms. This forced us to create an efficient layout. We used BIM in the interview room to show three dimensional design solutions incorporating evidence-based design features gleaned from The Center for Health Design, HERD and the RIPPLE database. Interpreting the evidence was a straightforward application of recognized logical design features taken from patient room zoning and staff/patient interactions.

Solution:
With enthusiastic support from the hospital administration, chip board mock-up rooms were created in a maintenance vehicle bay. Nursing staff and medical staff simulated patient transfers, code blue situations and toilet assistance. Design was monitored by architectural personnel and hospital representatives.

The first twelve months of monitoring indicated a reduction of 80% in patient falls. Monitoring will continue for a minimum of two additional years. If the results are consistent for 36 months, the entire design fee will be recovered by the savings from patient and staff injuries alone.
B+H+STH; A Case Study of Evidence-Based Design Influencing IPU Design Under a Public Private Partnership Process Ontario, Canada
Step 4: Create & Innovate EBD Concepts
Step 6: Collect Baseline Performance Measures
Step 7: Monitor Design & Construction

Goal:
A 960,000-square foot green field site regional hospital is being designed, built, financed and maintained (DBFM) for 30 years in Ontario, Canada under an AFP (Alternative Finance Procurement) process, a form of public private partnership delivery. Our goal was to develop an alternative plan for the typical Inpatient Unit (IPU) reflecting more efficient operational principles while complying with a nearly 10,000-page Project Specific Output Specifications (PSOS) document which included an Illustrative Design (ID) outlining operational and facility requirements while supporting the client vision of patient- and family-centered care.

Solution:
We utilized generally accepted nursing and clinical metrics for a hospital in this Canadian province and compared our design against the ID. This analytical information created our review process to determine how, justified based on agreed outcomes, we would arrive at required changes to the PSOS. Examples of where we provided EBD concepts that changed the ID include: A consolidated footprint using two interlocking triangular floorplates; Logistics support from a singular core providing public services and staff access to both of the two 38-bed units which is our typical layout of 76 beds per floor; 80% of rooms are singles; Additional support spaces recommended and implemented; Decreased travel distances for clinical staff based on nursing ratios; Accessibility features provided beyond statutory requirements to embrace the client’s model of care.

A monitoring process has been implemented as prescribed by the provincial government for the AFP public private partnership process to review the quality and conformance of the design to the PSOS.
American Art Resources; Mays Clinic, M.D.Anderson Cancer Center, Houston, TX
Step 7: Monitor Design & Construction
Step 8: Measure Post Occupancy Results

Goal:
To change the art program from an art-for-art’s sake to an evidence-based approach that uses research to determine appropriate art for patients and staff and collects evidence on the effectiveness of the art-intervention implemented. Five years after the opening of the new Mays Clinic a post-occupancy evaluation was completed to evaluate the impact of the evidence-based art program on patients and staff and compare the responses to the different guidelines implemented.

Challenge:
Five clinics were identified for the survey: Radiology/Oncology, Diagnostic Imaging, Outpatient MRI, CT Imaging and Breast Imaging; and 210 patients were surveyed. Patients were under high stress, so some declined to participate; surveys were left unfinished if a patient was called in, or felt too tired to respond. A web based staff survey received an unusually high response rate of 240 completed surveys.

Results:
Overall 90% of Patients/Visitors thought the artwork in the Clinic was good or very good. 84% of Patients/Visitors thought the artwork in the Clinic made them better. All results were statistically significant and ratings for artwork were consistently high. Waiting room comparisons found that response to images that had crisp and clear renderings of nature were higher than the more muted renderings using pastels. Garden scenes used in the radiology/oncology room received the highest ratings—there were no windows in this space which could explain the additional impact of art.

Overall 69% of the staff thought the artwork made them feel better. 97% of the staff thought the art was appropriate for the patients. The staff had positive comments about the role of art (distraction for patients, de-stressor for staff, promoting conversations, de-institutionalizing the hospital, soothing and comforting).
Let’s help caregivers get back to the business of healing.

Nurses walk over five miles every shift, navigating chaos as they juggle multiple tasks. We imagine spaces for caregivers that are more productive. More comfortable. Less chaotic. It’s time to take a new look at healthcare.

Nurture is proud to underwrite the EDAC exam preparation materials.

nurture.com
Order your EDAC Study Guide Series (1-3) to prepare for the exam.

- Guide 1 (Print or PDF) is FREE
- Guide 2: $95
- Guide 3: $95

Purchase the entire set for $180. Visit store.healthdesign.org or call 925-521-9404 to place an order.

Become an Advocate Firm and receive discounts on the exam and Study Guides.

Advocate Firms show their commitment to the EDAC program by dedicating a minimum of 25% of their healthcare teams to completing the EDAC exam process within one year.
The Center for Health Design (CHD), formed in 1993, is a nonprofit organization whose mission is to transform healthcare environments for a healthier, safer world through design research, education and advocacy.

CHD began development of EDAC in 2005 with a grant from the Robert Wood Johnson Foundation. EDAC represents the cumulative work of volunteers, support from Nurture and CHD staff and consultants. The program launched in 2008 offering study preparation resources, access to healthcare design expertise, a comprehensive accreditation exam and continuing education. For more information, please visit www.healthdesign.org.