

Healing Through Evidence-Based Design

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A patient environment designed to impart wellness and comfort in all dimensions—mind, body and spirit—is as vital to cancer care as science and technology. Increasingly, research is demonstrating that environmental factors such as natural light, pleasant views, artwork, and even use of certain colors, have the potential to transform what would otherwise be a highly stressful and frightening encounter into one that imparts a powerful healing and therapeutic effect. Implemented effectively, healing-focused and evidence-based design can potentially improve a cancer patient's ability to cope with the emotional and physical aspects of the disease and its treatment—and, ultimately, increase patient satisfaction.

Putting Evidence-based Design into Practice

Defined as the deliberate attempt to base design decisions on documented research and well-established best practices, evidence-based design seeks to provide a higher quality experience to patients and their families while simultaneously improving organizational effectiveness. Already familiar with evidence-based medicine, today's healthcare administrators are increasingly comfortable with a growing base of evidence-based design research that supports the idea that the “built environment” can affect patient clinical outcomes.

To ensure the integrity of the practice, D. Kirk Hamilton, a professor of architecture and a fellow of the Center for Health Systems & Design at Texas A&M University, advocates increasingly rigorous levels of commitment in using research to create a healing environment.¹ Hamilton is also on the board of directors at the Center for Health Design (CHD), which, since 1993, has been actively engaged in initiating research to promote evidence-based design to create healing

The newly-designed short infusion center at Cedars-Sinai Out-patient Cancer Center.

environments in hospitals, clinics, physician offices, nursing homes, and other healthcare facilities.

CHD is dedicated to the idea that evidence-based design can enhance the quality of healthcare through the creation of environments that are:

- Therapeutic
- Supportive of family involvement
- Efficient for staff performance
- Restorative for workers under stress.

Ultimately, such environments are psychologically supportive and conducive to reducing stress for families, patients, and caregivers. These characteristics affect not only patient outcomes, but staff recruitment and retention, as well as operational efficiency and productivity.²

In 2000, the Center for Health Design developed a research program that allows innovative healthcare providers to team with CHD in producing research and documenting examples of “how the built environment can positively affect the quality of healthcare and the financial performance of the organization.” The Pebble Project—so named because a pebble tossed in a pond creates a ripple through the entire body of water—began with four partner hospitals that would implement and study evidence-based design.





Artwork inspired by nature at Cedars-Sinai Outpatient Cancer Center.

One of those initial partner hospitals was the 348-bed Bronson Methodist Hospital in Kalamazoo, Mich. Prior to any construction, the hospital conducted focus groups with patients and families, elicited staff input, and conducted site visits at other hospitals. From a virtual blank slate, the now healing-focused Bronson Methodist Hospital emerged. Newly private patient rooms featured individual thermostats and larger windows with layered shades. Intuitive signage was incorporated throughout the building so that patients can easily find their way. The design also featured a horticultural garden and fishpond in the main foyer and natural light penetrating most areas of the building. In short, the hospital integrated the arts and developed a level of design that provided comfort and enrichment to its patients and families and staff.

Within the first year of the new construction, the hospital:³

- Documented nursing vacancy rates at half the state average
- Experienced a decrease in patient transfers
- Increased patient sleep quality
- Saw 1,000 more admissions than the previous year
- Enjoyed a five-point increase in market share
- Increased overall patient satisfaction to 96.7 percent.

Ongoing research on healing environments continues to multiply steadily. In 1998, only 84 studies were published on evidence-based design; by 2004, there were 600. From this research four main themes have emerged: 1) social support, 2) patient control, 3) positive distractions, and 4) the influence of nature. Each of these components serves as a keystone in the healing environment's creation.^{4,5}

Patient Benefits

Given that the potentially frightening specter of cancer and its treatments may innately erode a person's feeling of control, it is essential that cancer patients, in particular, feel a sense of mastery over their environment—and, in turn, the disease—at every step of the treatment cycle. Research shows that people who feel a measure of control over their situation are typically better able to cope with stress and have better health than people who do not feel in control.^{6,7} On the other hand, unavoidable and painful medical procedures, long wait times, and disruptions to sleeping and eating all contribute to the cancer patient's loss of control. Noisy environments that deny privacy, lack natural lighting, and are confusing for patients to navigate further aggravate the patient's feeling of powerlessness.

In contrast, healing environments, which provide comfortable, attractive settings and home-like surroundings, have been shown to be a therapeutic intervention in the reduction of stress.⁸

Ideally, cancer patients should be able to exercise control by having the option to choose privacy instead of socialization, lighting levels, type of music, seating options, and quiet or active waiting areas. While many cancer patients favor private rooms, some individuals prefer having the companionship and support of other people. Therefore, your community cancer center's design should accommodate both preferences.²

Today many cancer centers are taking patient control a step further by allowing patients to personalize their environment at the touch of a button. Beyond enabling patients to control lighting, room temperature, and entertainment, these facilities offer patients personal control over communications by, for example, allowing patients cell phone use or Internet access while receiving treatment or recovering. These low-cost services can increase patient comfort and also bestow a sense of empowerment.⁹

Staff Benefits

The same healing elements that provide a calm and reassuring environment for cancer patients and families are also beneficial to staff, administrators, and clinicians. For example, natural light and a less noisy environment can help decrease distractions and minimize medical errors.⁹ Our aging healthcare workforce is another practical consideration; providers may benefit from improved lighting and efficient design that eliminates the need to walk long corridors and distances for supplies and medications. All staff can benefit from design that takes into consideration the overall work environment. For example, your cancer center design might incorporate decentralized charting stations mixed in with quiet places for providers to collaborate about patient care.^{10,11}

Just as enhanced privacy and control are important for patients, many providers—who may be caring for families or aging loved ones—may appreciate a workplace that provides private spaces for staff and comfortable break areas. These spaces allow employees to stay in touch with family members, along with the sense that they can temporarily escape the demands and stress of the workplace.

Designing a healing-focused environment can affect the bottom line of your cancer center by keeping your costs down.¹² Take, for example, the turnover of your oncology nurses. Current estimates put the cost of replacing an RN from \$82,000 for an experienced nurse to \$88,000 for nurses with longer learning curves, such as an oncology nurse.¹³ Other costs related to RN turnover include vacancy expenses, e.g., the use of temporary nurses, overtime, closed beds, and patient deferrals. A healing-focused and supportive cancer center environment, can lead to:

- Streamlined workflow
- Fewer medical errors

A Patient-centric Redesign

The Cedars-Sinai Outpatient Cancer Center at the Samuel Oschin Comprehensive Cancer Institute opened in 1985 and moved to its current facility in 1988. At that time, the Cancer Center's award-winning design reflected the current thinking about healing design. The underground building featured 30-foot ceilings, hard edges, and industrial surfaces. From the architects' perspective, these choices reflected a "deconstructivist" strategy aimed at providing comfort and confidence to patients by acknowledging the realities of fighting cancer.

Unfortunately, the patient experience of the center's architecturally impressive design was quite different. Some patients surveyed described the cancer center as "scary, like going into a tomb." Most notably, respondents characterized the cancer center's physical environment as cold, noisy, and drab, with poor lighting, hard chairs, and "morgue-like" modern art. One patient, an artist, commented on the negative impact of the stark white walls, black-and-white photos, harsh lines and black frames, and expressed the need for more soothing, nature-inspired pictures. For this patient, the "squiggles" in the Center's modern art pieces were reminiscent of a cancer patient's painful awareness of how quickly everything can change, even for those in remission.

A Time for Change

Having experienced dramatic increases in patient volume over the past several years, the Center had been steadily outgrowing its long-time facility. So the timing was perfect to embark on a complete redesign and reconstruction with a new emphasis on healing design.

In 2005 the Center launched a patient-focused Healing Design Survey and found patients to be

extremely knowledgeable and articulate on the subject of holistic, healing design concepts. For example, survey respondents pointed out the need to eliminate fluorescent lighting, white hallways, and severe artwork, in favor of natural light, warm colors, and artwork depicting nature. Written survey responses were analyzed by tabulating the number of citations in various categories and the frequency of specific words and sentiments appearing in patient comments. For example, comments in the Furniture and Comfort category indicated the patients' desire for attributes such as "cozy," "not facing each other," and "space for family and IV equipment." Similar specifics were offered in the Lighting, Ambience, and Décor category (including "softer," "less sterile," "soothing," and "recessed"), as well as in the Color, Waiting Areas, and Art/Inspiration sections. Using the survey results, the cancer center prioritized the respondents' most pressing concerns and focused initial design changes in those areas.

During the survey process, Cedars-Sinai began working with American Art Resources, an art consulting firm focused exclusively on using fine art to create healing environments for the healthcare industry. Within 12 months, new artwork was placed in the private infusion rooms, restrooms, and physician areas. Additionally, the restrooms were painted in warmer earth tones, earning immediate patient approval.

Listening to Patients

An important part of this phased in redesign process was the creation of a Patient Advisory Council—including former and current patients—in May 2007. Since then, the Advisory Council has met monthly, providing input on a number of projects including design. For example, the Council helped select newly commissioned artwork. The Council recommendations addressed a range of design elements from the patient perspective, from moving a plug or raising a countertop to such long-term

- Improved employee morale
- Less absenteeism
- Reduced turnover.

The Components of Healing

Once the decision is made to incorporate healing-focused design elements into your cancer center, where do you start? The components of a healing environment can best be defined as those that nurture and restore balance to the mind, body, and spirit through each of the five senses.

Light and color, for example, are two aspects of sight that can have the greatest overall impact on a patient's well-being.¹¹ Research suggests that artificial light, in the absence of natural light, can lead to fatigue, depression, and elevated systolic blood pressure. Conversely, exposure to natural sunlight is associated with improvement in mood and sleep, as well as decreased use of pain medication and possibly even shorter lengths of stay for some patients. Use of color is also a powerful component of the healing environment and dates back to ancient times. Research shows that color has an effect

on both the pituitary and thyroid glands; blue and green, for example, have been shown to promote relaxation and balance, while yellow and orange seem to activate and energize a room.¹⁰ When skillfully integrated as part of the patient's sensory experience, the arts can also contribute to the healing environment through imagery that celebrates life, amuses, and imparts messages of peace, hope, tranquility, comfort, and dignity. Art in the form of gardens, sculptures, and water features such as waterfalls and ponds can also be effective.

In cancer center design, sound has the potential to be relaxing or agitating. Organic sounds, such as rain, moving water, or songbirds can improve function of the autonomic nervous system, helping release endorphins, while unwanted sounds—whether it is music, machinery, or conversation—can increase heart rate, blood pressure, and respiration rate, and disturb sleep patterns.

Incorporating music into the healing environment—if the patient enjoys the music—can have an analgesic effect, reducing blood pressure, heart, and respiration rates.⁸ Several studies have shown, across a variety of patient groups,

projects as redesigning the oncology waiting room.

Patient insights helped the cancer center to re-examine the facility's overall color scheme, as well as the impact of the 30-foot-high ceilings in relation to temperature control in this underground facility.

Today, the redesign at Cedars-Sinai Outpatient Cancer Center is nearing completion. Plants are plentiful throughout the Center. The new short infusion area offers high-arched ceilings and enhanced lighting with spectacular glass panels that reflect the changing colors of sunlight. Shoji screens will separate the individual infusion stations and afford as much privacy as the patient desires. Each cubicle provides cozy recliners and visitor chairs, as well as personalized self-contained environments featuring television and temperature controls. Private conference rooms for family meetings are another important component.

In May 2008, the center's new waiting area opened. With art, the use of color, and the addition of "clustered" comfortable furnishings, this is now a welcoming, patient-friendly environment for patients and caregivers.

Through the redesign process, patient satisfaction scores in Press Ganey's Outpatient Cancer Center survey have remained steady—despite the center-wide construction projects—and management anticipates that the facility redesign will lead to further improvement in the scores, from the current 87.9 to the target of 90.

By fall of 2008, the newly renovated and expanded cancer center will be complete, with every single square foot changed for the better. With the project's completion, the cancer center will include a new clinical research unit for patients in experimental treatment programs. Additionally, the Infusion Center, examination areas, and waiting rooms will nearly double in size. These newly renovated areas will feature pastel wall coloring and artwork inspired by the nature. 🏡

that pleasant music, especially when controllable [i.e., when the patient is able to exercise control over the music], often can reduce anxiety or stress and help some patients cope with pain.^{14,15} Research also indicates the effectiveness of music in mitigating nausea and emesis in chemotherapy patients and reducing the stress of visitors in hospital waiting rooms.¹⁶

Patient-centric Design: The Aptium Approach

Since inception, Aptium Oncology designed its network of hospital-based cancer centers around the special needs of oncology patients and their families. Today, Aptium combines healing-focused components with a patient-centric philosophy that approaches each individual design element from the patient's perspective.

For example, patient flow is a major consideration in space planning. Aptium carefully matches "complementary functions" during the design process, ensuring patient-friendly adjacent locations for examination and lab areas, treatment and pharmacy areas, and changing and radiation

areas. Process flows are planned carefully and in accordance with how each type of patient moves through the center. The chemotherapy patient, for instance, should enter the center and proceed to the lab—ideally located near the concierge—for blood work. The patient should then smoothly transition to the treatment area where the lab results are available within a 15-minute time frame and continue through the treatment process flow, concluding with education about the treatment received and what to anticipate on returning home.

At Aptium-affiliated Trinitas Comprehensive Cancer Center in Elizabeth, N.J., a patient tracking system further personalizes the cancer patients' experience. On arrival, patients are greeted by a concierge. Each patient is then entered into the computer tracking system, which alerts every clinical department of the patient's arrival. The patient is then automatically checked in—and subsequently tracked—by each department, ensuring that the patient does not get "lost in the system," and enabling each department to better anticipate its workload with immediate and ongoing communication about any schedule changes or adjustments.

The Business Case for Psychologically Supportive Design

While facility planning and construction costs for supportive design may seem out of reach for some community cancer centers' budgets, keep in mind that most supportive design elements are likely to cost no more than design elements in poorly designed or unsupportive facilities. That said, cancer centers looking to develop or upgrade to an evidence-based design facility must first conduct research that considers local market characteristics and incorporates meaningful consumer input. Smart research translates into smart renovations and upgrades that improve consumer preference, increase patient satisfaction, and move market share in favor of the facility.¹² When effectively executed, the use of psychologically supportive design criteria offers a broad range of short- and long-term advantages to patients, family members, and staff, including:^{2, 10, 16, 17}

- Reduction of stress and anxiety for patients and family members
- Reduction in pain and less need for pain management
- Reduction in occurrence of infection
- Improved sleep and restoration
- Improved patient satisfaction
- Reduction in staff stress and errors
- Improved job satisfaction
- Greater staff productivity
- Increased ability to retain quality caregivers
- Overall cost savings through increased operational efficiency and improved medical outcomes
- Differentiation from other providers in the market.

Optimal cancer care balances medicine and technology with wisdom and compassion, bringing these elements together in an environment in harmony with nature. Research shows that the design and creation of healing environments can create such a balance, making a significant impact on the quality of patient care and the quantity of patient satisfaction—while promoting well-being of the mind, body, and spirit. 🏡

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Natural Connections

The concept of a healing environment that positively affects patient outcomes is not new. The connection between healing and harmonious surroundings was embraced throughout Ancient Greece, where the sick and injured sought to restore harmony amidst the healing surroundings of nature, art, and music at temples to the Greek God Aesculapius. Renowned for their architectural grace and therapeutic excellence, the Asclepian healing temples were typically situated near mineral springs on mountainsides or in wooded hills.

Centuries later, Florence Nightingale would write extensively about optimizing environmental factors to improve patient comfort, and facilitate health and healing. Nightingale recognized the spiritual nature of human beings in relation to environmental, biological, psychological, and social aspects of patient care. She also addressed what she believed to be fundamental essentials of the patient experience, asserting the therapeutic benefits of variety in a patient's surroundings:

- Direct sunlight
- Bright-colored flowers
- A peaceful and restful environment.

But it was in 1984 that a landmark study conducted by Roger Ulrich—a professor of architecture, behavioral scientist, and the undisputed “guru of evidence-based design”—demonstrated the calming and positive effects of natural views and gardens in hospitals. Simply looking at environments dominated by greenery, flowers, or water for only three to five minutes was found to serve as a “positive distraction.” This distraction led to diminished stress and restoration, as measured by positive

changes in blood pressure, heart activity, muscle tension, and brain electrical activity.^{1,2}

Ulrich further noted that patients with access to such positive distractions, which stimulate the senses and connect patients to the rhythms of the natural world, realized numerous health-related benefits including fewer minor post-surgical complications such as persistent headache and nausea, and tended to have shorter post-surgical hospital stays. Conversely, patients whose view was a brick wall required significantly more injections of pain medication and were cited in nurses' notes far more frequently in terms of negatives in their overall condition and disposition.

In addition to the restorative benefits realized by patients, families, and employees, Ulrich noted that overall healthcare delivery costs dropped and staff satisfaction improved. Evidence further suggests that gardens and other natural elements help to heighten both patient and family satisfaction with the healthcare provider and overall quality of care, and may be instrumental in establishing a positive market advantage for the healthcare provider.^{1,2}

Ulrich's research was the first to scientifically document the health-related benefits for patients viewing nature. His findings subsequently prompted designers, architects, and healthcare leaders to rethink the relationship between environment and healing, as well as the relationship between patients and room design. ❏

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