

Infusion of Evidence: Balancing Patient Desires with Environmental Evidence

by Michael Puksza, AIA

Travel back in time to 1990. Imagine yourself at a ribbon-cutting ceremony for a state-of-the-art cancer center. Now fast forward to 2010. Twenty years—a short time in the life of a building—but a long horizon when you try to envision future advancements in cancer care. Who in 1990 could predict all of today’s new cancer-fighting technologies? Targeted pharmaceuticals? Minimally invasive and robotic surgery? Proton therapy? IGRT? Tomotherapy? If you are planning a new cancer center today, you need to be looking ahead to at least 2040. A critical question is not just how do you plan for today’s cancer patient, but how do you plan for the patient and provider of tomorrow? What are the right choices? More importantly, what choices are wrong?

When it comes to healthcare architecture, there is no more complicated building type to design than a comprehensive cancer center. This structure has to create a comfortable home for patients receiving some of the most daunting therapies delivered with some of today’s most advanced medical technology. At the same time, the facility’s design must manage the expectations of patients, families, staff, physicians, administration, and the community. And architects involved in designing the new cancer center need to understand that they can actually influence a patient’s well-being—for better or worse—by the stroke of their pen.

Defining Evidence-based Design

Sadly, there has historically been little evidence to assist in the multitude of decisions that need to be made during the cancer center design process. The field of evidence-based design is in its infancy, with just over 1,000 studies that attempt to link healthcare environments with outcomes. (The Center for Health Design defines evidence-based design as the process of basing decisions about the built environment on creditable research to achieve the best possible outcomes.) Of these studies, the vast majority are focused on inpatient environments. Since more than 80 percent of oncology care is delivered in outpatient settings, most of this research is difficult to apply to cancer care environments.

To begin to fill this void, Cannon Design has been involved in a multi-year, multi-facility research study to answer two basic questions:

1. What are patient and family preferences related to the infusion therapy environment?
2. Does the physical environment in which patients receive infusion therapy impact their well-being?

The research study has been designed in three stages. Stage 1 includes face-to-face interviews with cancer patients, cancer

survivors, family members, and cancer center staff. Stage 2 includes formal surveys of cancer patients and family members going through active treatment. Stage 3 represents the results of post-occupancy evaluations on several facilities that have incorporated our research results in the design of their cancer center. These evaluations seek to identify if the environment was able to impact patient care. While Stage 3 is currently in progress, we have already learned a great deal.

Creating a Healing Environment

As mentioned above, much has been written about designing a healing environment for hospital inpatients. However, it’s important not to assume that the findings regarding inpatient environments necessarily apply to the highly outpatient-focused cancer center of today. In the first year after diagnosis, the average cancer patient may make 100 visits to receive treatment. A cancer patient receiving care in the ambulatory setting has very different needs and desires than the typical acute inpatient. Most cancer patients under active treatment come to the cancer center daily or weekly for time periods ranging from 15 minutes to six to eight hours. Therefore, the cancer center environment should be welcoming and easy to navigate for the first-time visitor and equally convenient for patients who will spend only a few minutes in the building every day. At the same time, the center not only needs to offer a variety of amenities and distracters for patients whose treatment lasts for many hours, but also accommodate the needs of family members who accompany the patient.

Infusion of Evidence Research Study

The Cannon Design infusion study spans 10 years and includes interactions with more than 300 intravenous infusion patients. The demographic of patients crosses the United States from Maine to California, and includes patients of community-based cancer centers and NCI-



(Top) Exterior shot of the Lawrence and Idell Weisberg Cancer Treatment Center, part of the Barbara Ann Karmanos Cancer Institute, in Farmington Hills, Mich. (Bottom left) A popular design feature at the Weisberg Cancer Treatment Center is the Patient Garden. (Bottom right) The Family Lounge at the Weisberg Cancer Treatment Center offers patients and family members an open social area furnished with comfortable chairs, tables, books, and a fireplace.

designated Comprehensive Cancer Centers. Researchers used both qualitative methods of inquiry, i.e., face-to-face or group interviews, and quantitative methods, i.e., formal surveys. The mix of respondents includes slightly more females (76 percent) than males, but represents a broad spectrum of cancer types. All respondents were adult, with 70 percent over the age of 50.

The survey tool was comprehensive, including more than 200 questions that collected information regarding patient environmental preferences. The survey tool attempted to correlate patient well-being with the characteristic of the physical environment they were exposed to while receiving treatment. Questions included items such as: *Are you in a private room or a shared space? Did you interact with other patients today? Can you see a window? Can you see outside? Are you nervous or apprehensive?* Questionnaires were distributed to patients that chose to participate in the study at the beginning of their infusion treatment, and were collected at the end of the day. The study is a single point-in-time study, and does not follow

patients through their entire treatment regimen. Results were analyzed by both professionally registered healthcare architects, as well as PhD researchers with focused experience on analyzing the impact of environment on behavior.

To date, the research results have revealed information about three key factors:

- The importance of control
- The myth of privacy
- The power of distraction.

The Importance of Control

Chemotherapy patients spend many hours in infusion centers. Infusion times of eight hours or more are not uncommon. During this time, patients have multiple needs and desires, and experience different physical reactions to the infusion agents. In the course of our research, we asked specific questions designed to help us understand the types of amenities patients desired. We found that many results related to issues of control. Examples include such environmental controls as light, sound, and

entertainment. As shown in Figure 1 on page 27, temperature control ranked as most important to those patients surveyed. In planning for a new community cancer center, consider ways to allow patients to have individual control over the temperature of their environment. Historically, this feature has been a difficult and expensive one, as it has required the installation of radiant heaters over each patient station or multiple HVAC control zones. Today, easier solutions are available as some infusion chair manufacturers offer heated-seat options in their product line.

As one cancer patient who was interviewed stated, “A sense of control is important because cancer takes away your control.” Providing patients with options for controlling lighting, temperature, sound, and glare can give patients a sense that—while they may not be in control of their disease—they can have some control over their treatment environment and make themselves as comfortable as possible.

The Myth of Privacy

For the past decade or more, significant investigations by multiple researchers have shown that private inpatient rooms have substantial advantages over multi-bed inpatient rooms.^{1,2} Advantages to private rooms include decreased falls, decreased nosocomial infections, and improved patient satisfaction. The results of this research are far reaching, and have even changed the codes under which hospitals are constructed, severely restricting the use of multiple-bed inpatient rooms. But does this research apply to all hospital care environments, including ambulatory infusion centers? Our study results suggest quite the opposite.

In interviewing and researching the type of environment that a chemotherapy patient desires, Cannon Design has discovered that many patients do not prefer a fully private environment. Patients tell us about the incredible support they receive by discussing their treatment with others who are going through the same experience. This interaction would not be possible in an all-private-room environment. Patient stories often



Lobby and staff reflection zone (inset) at Baltimore Washington Medical Center’s Tate Cancer Center in Glen Burnie, Md.

PHOTOGRAPHS COURTESY OF CANNON DESIGN



Nurse station at the Indiana University Melvin and Bren Simon Cancer Center, Indianapolis, Indiana. At the infusion center (inset) patients can opt for a completely private room or treatment in an open station with six other patients. If they select the open station and then want some privacy, patients can move sliding wood and glass screens to enclose their area.

Figure 1. Patient Desires for Their Cancer Center Environment

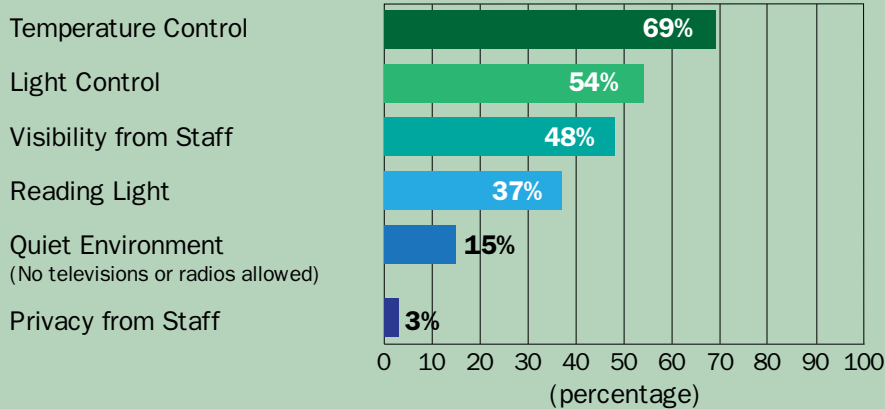


Figure 2. Patient Desires for a Private vs. Open Room

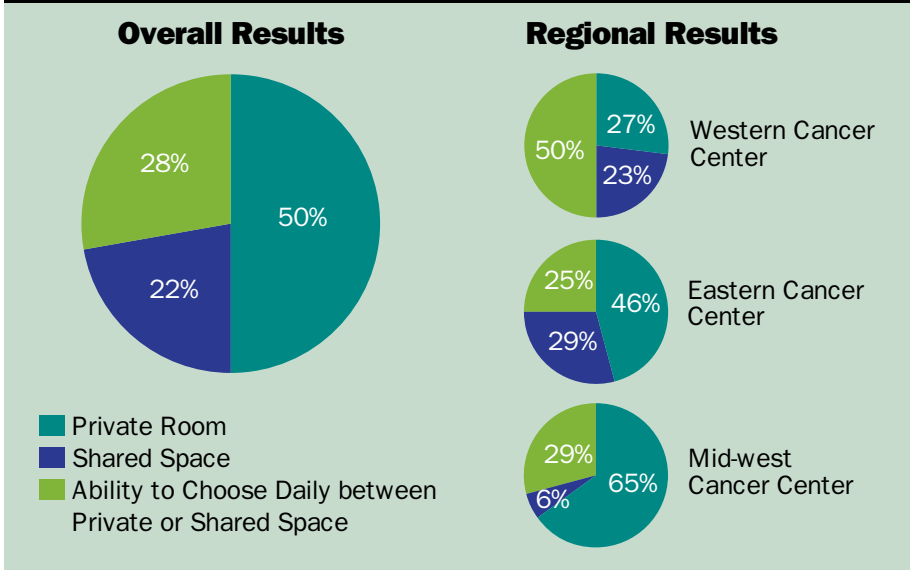
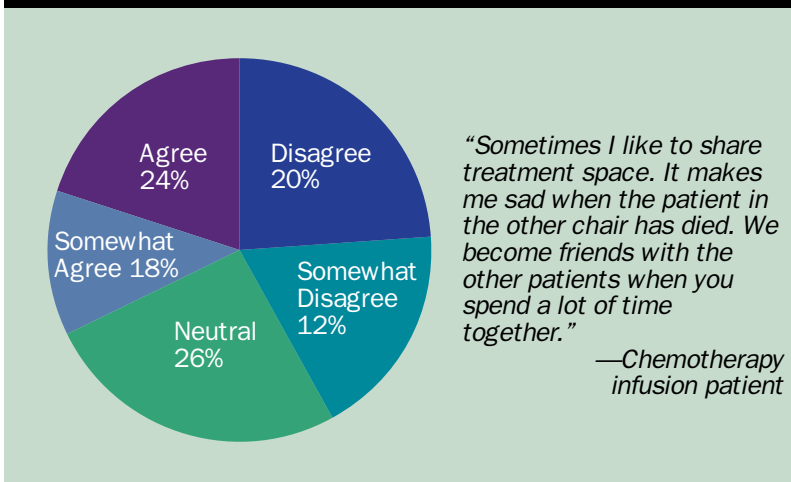


Figure 3. Responses to Whether Cancer Patients Like Being the Only One in the Room



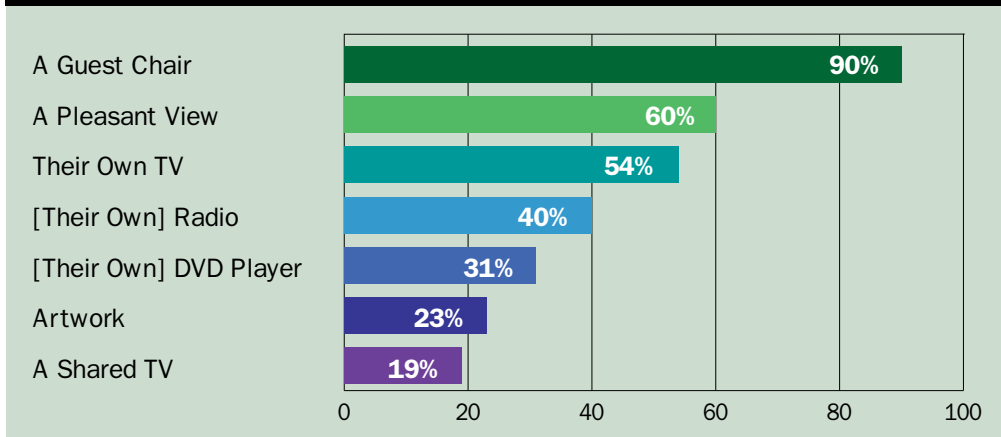
end in discussions about the friends they have made in the infusion center, and the support that they were given by peers going through the same treatment. As one patient described, “I really felt good about helping a patient sitting next to me. She didn’t speak English, but holding hands with another patient means the same thing in any language.” But can this qualitative statement be supported by quantitative analysis?

When patients are asked if they prefer receiving treatment in a private room or in an open infusion bay with other patients, 50 percent of respondents say they want a private room. The remaining 50 percent is equally split between patients who always want open infusion environments and those that prefer a choice, often depending on how they may feel on any particular day. So the solution seems clear cut—the facility design should provide an approximately equal mix of private and multi-patient environments. However, we have found that responses vary greatly depending on the patient population surveyed. For example, results from an NCI-designated

cancer center in Illinois showed that 67 percent of patients desired a private room. However, results from a large community-based cancer center in Arizona showed that only 27 percent of patients desired a private room (see Figures 2 and 3 at left). Prior to making any decision regarding private-to-open ratios for a new design, facility planners should conduct research to understand the unique characteristics of the patient population for which the cancer center is being designed.

Researchers also queried patients about their desire for privacy from nursing staff. Overwhelmingly (97 percent), patients expressed a desire to “be seen” by a nurse. This result is not surprising, given that most patients are comforted knowing that a nurse is close by, but providing this level of visual contact is more challenging when patients are in private rooms. Bottom line: research seems to show that providing a mix of private and multi-patient infusion

Figure 4. Patient Responses to Entertainment and Positive Distracters



environments is appropriate, especially in view of the results of the final component—the power of distraction.

The Power of Distraction

One of the most interesting aspects of our study is that researchers discovered a very strong correlation between a patient's emotional well-being and receiving treatment in an environment that offers positive distracters.

Positive distracters are elements in the environment that offer patients a means of mitigating stress. These distracters can be visual or auditory and are often interactive. Examples include music, views of nature, and aquariums. For the last several decades, designers of healthcare environments have understood that positive distracters can play an important role in the healing process. A groundbreaking study linking environment to physical outcome in a hospital occurred in the early 1980s when it was found that inpatients with window views looking out on nature had improved results compared with patients who had a window view of a brick wall.³

Is this research based on an inpatient environment applicable to the outpatient cancer care environment? While the answer to this question is “yes,” our research found an even more important distracter that was shown to improve patient well-being—interaction with others. As Figure 4 above shows, when patients were asked what types of dis-

tracters they preferred, the most desired distracter was not a flat-screen TV or access to the newest blockbuster movie, but a guest chair. This simple fixture in an infusion therapy environment is the most desired attribute by

patients and their families. It was also found to be the most powerful.

To evaluate a patient's well-being, researchers were looking for an end result of a patient who after treatment was “hopeful for his or her next treatment.” This choice indicated that the patient had finished treatment with a positive enough experience that he or she could come back for their next cycle. When correlating all of the factors that could influence this outcome, the most significant correlation occurred for patients who were exposed to positive distracters, and the single most powerful distracter was speaking with another person. Interestingly, researchers also found that the statistical correlation among patients interacting with loved ones had significantly less advantage than patients speaking with other patients. This finding further suggests that an environment that encourages patient-to-patient interaction may be a desirable element in new facility design, again emphasizing the importance of providing an option for patients to choose an open, interactive care environment.

Designing for Patients, Family, and Providers

Spaces for patients' family members should not be overlooked during the design process. Caregivers often accompany patients during treatments and need a variety of spaces in which to relax and reflect, engage in private consultations with medical and support staff, and access information about health and community resources. The cancer center needs to offer opportunities for family members to develop their own support network by talking to other families about supporting the caring process.

The new facility design must accommodate the needs of staff as well. The creation of a positive patient experience is only achievable if the staff that is delivering care is competent, compassionate, and dedicated. Facility design can foster an environment that enhances the cancer center staff's ability to provide quality care. In today's challenging recruitment and retention environment, a new facility can be an incredible tool for enhancing the staff's performance. Considerations include separating patient and staff access points and circulation and workflow spaces so that staff can enter work spaces without crossing paths with patients and families, avoiding potential distractions that might otherwise result. Patient care areas and associated nursing stations, staff-support spaces, and circulation workflow

5 Questions to Ask Cancer Patients Before You Design Your Infusion Center

1. What is your preference for infusion: private, shared with other patients, or the choice of private or open space?
2. If you are in a shared environment receiving chemotherapy, what is a comfortable number of patients to be with?
3. How many visitors did you bring with you today?
4. If you had a choice, how many visitors would you have brought with you?
5. What amenity in the current facility is very important?



Architect rendering of the exterior of University Hospitals Case Medical Center Cancer Hospital in Cleveland, Ohio.

patterns should be designed to maximize efficiency, productivity, and visibility. As one patient told us, “These men and women here are angels—they are our lifeline.”

At the same time, planners must recognize that for many oncology providers, cancer care is a very personal, intensive job that demands quiet time to retreat and regroup. Facility design should include zones of staff sanctuary that are separate from patient areas, including spaces for quiet reflection, as well as for conversation and dining. For example, at the 60,000-square-foot Tate Cancer Center in Glen Bernie, Maryland, patient and staff access points are separated so staff can enter work spaces without crossing paths with patients and families. Staff members also have access to private reflective and dining areas that are separate from treatment functions, with views to the same healing gardens that bring a sense of calm and well-being to patients.

The Power of the Design Process

In 2008 the United States spent \$2.2 trillion on healthcare, according to the Centers for Medicare & Medicaid Services. Yet, according to *Modern Healthcare's* 2010 Construction and Design Survey, the nation invests only \$75 billion annually on healthcare facility construction or about two percent of the total cost of healthcare. The facility planning and design process can impact the delivery of healthcare. While direct caregiver-patient contact comprises 100 percent of actual care, it represents perhaps only 10 percent of the overall experience while receiving care. The patient's experience of care includes all the steps leading up to and following contact with the caregiver, including arrival at the facility, parking, entry, reception, wayfinding, views, finding the

treatment room, and so forth. Facility planners and designers can have a significant impact on the “other 90 percent” of the overall experience of care through the clear organization of space, light, materials, and the other elements in the vocabulary of architecture. With the investment in construction of healthcare facilities representing just a small fraction of total healthcare costs, spending on healthcare facility construction is clearly not driving the rising costs of healthcare in our society. However, the investment in facility design can be a significant catalyst for change. If the healthcare industry uses the facility planning and design process to reinvent the patient experience, we can make quantum improvements in the care of cancer patients. 📌

Michael Pukszta, AIA, is a principal of Cannon Design. He has more than 20 years of experience in cancer center planning and design worldwide, working with both large, nationally recognized NCI-designated cancer centers, as well as regional and community cancer centers.

References

- ¹Ulrich RS, Quan X, Zimring C, Joseph A, et al. The role of the physical environment in the hospital of the 21st century: a once-in-a-lifetime opportunity. *Designing the 21st Century Hospital Project*. A Report to the Center for Health Design. Available online at: http://www.healthdesign.org/research/reports/pdfs/role_physical_env.pdf. Last accessed April 13, 2010.
- ²Vietri N, Dooley D, Davis CJ, Longfield J, et al. The effect of moving to a new hospital facility on the prevalence of Methicillin-resistant *Staphylococcus Aureus*. *Am J Infection Control*. 2004;32(5):262-267.
- ³Ulrich RS. View through a window may influence recovery from surgery. *Science*. 1984;224(4647):420-421.