

Designing to Heal

A new trend in evidence-based, 'nurse-friendly' hospital design.

It seems that Florence Nightingale was on to something. In 1860 Nightingale published her classic text *Notes on Nursing: What It Is, and What It Is Not*, which above all else promoted the need for fresh air and natural light.

Nearly 150 years later, studies are revealing the profound impact of the physical environment on a wide range of areas, from patient outcomes and length of hospital stay to medical errors and staff stress. Health care facilities are taking action.

"We're seeing a huge hospital-building boom right now. The hospitals built from the early 1950s through the 1970s have reached the end of their lifespan," says Craig Zimring, an environmental psychologist and professor of architecture at the Georgia Institute of Technology in Atlanta.

The Institute of Medicine's reports on the high prevalence of medical errors shook both the public and the health care industry. According to Zimring, those reports were part of the impetus to design safer, less stressful—and more healing—environments.

Just as health care practitioners use evidence to make clinical decisions, architects and hospital administrators are looking at statistics and scientific studies to redesign outdated facilities. Evidence-based design involves the use of architectural methods proven to improve patient outcomes, safety, and satisfaction, as well as staff retention and service efficiency.

Planetree. Some of this work was pioneered nearly 30 years ago by Angelica Thieriot, the founder of Planetree. In 1978, having felt traumatized by the cold, impersonal nature of care she'd encountered during a hospitalization, Thieriot endeavored to develop a health care facility in which patients could receive support and healing on all levels—emotional and spiritual as well as physical. Planetree was the result of her efforts and was a forerunner to evidence-based hospital design. Today, Planetree is a nonprofit organization that works with hospitals and health care centers to—according to its mission—develop and implement health care models that cultivate healing of mind, body, and spirit; are patient centered and holistic; and support patients' active involvement in their own care. Planetree also believes that the physical



Courtesy of Bronson Healthcare Group

With hundreds of plants, a pond, and abundant natural light streaming in, the Garden Atrium is one feature of Bronson Methodist Hospital, Kalamazoo, Michigan.

environment influences the healing process, and it has long supported much of the architecture and interior design that's now being acknowledged as conducive to patient recovery and the health of the staff. Planetree has supported design factors that are more homelike and less institutional, that are barrier free and support patients' dignity and encourage family participation. The design of a Planetree facility, for example, may provide ameni-

ties such as libraries, kitchens, and lounges, with comfortable accommodations for family members who wish to stay overnight. Hospital interiors and exteriors include fountains, gardens, fish tanks, and waterfalls, all designed to be nurturing and relaxing for patients. Currently, there are 95 health care settings throughout the United States, Canada, and Europe that follow the Planetree model. For more information, see www.planetree.org.

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The evidence. The Robert Wood Johnson Foundation, the nation's largest philanthropy devoted exclusively to health and health care, has taken a strong interest in evidence-based hospital design and is examining its impact on nurse satisfaction and safe patient care. It provided funding to the Center for Health Design (a nonprofit research organization) for the Designing the 21st Century Hospital Project, which is the most extensive review of the evidence-based approach to hospital design ever conducted. (See www.healthdesign.org.)

A large number of studies, for example, have shown that exposure to natural light reduces depression and fatigue and improves alertness. "Improved lighting allows staff to improve their performance of visual tasks," said Anjali Joseph, director of research at the Center for Health Design. "It also helps support circadian systems and affects mood and perception."

A literature review conducted by Joseph for the Center for Health Design revealed that windows in the workplace are also associated with an increase in workplace satisfaction.¹ The review also showed that exposure to sunlight can decrease the length of hospital stay in patients who've had a myocardial infarction, can lessen the need for analgesics, and can decrease agitation among nursing home residents with Alzheimer disease.

Zimring, along with Roger Ulrich, director of the Center for Health System and Design at Texas A&M University, and other colleagues, conducted an extensive analysis of existing research on hospital design and the impact of design on clinical outcomes.² The results of their research lent strong support to the idea that the environment makes a

substantial impact on both patient and staff well being. And a poorly designed facility, they noted, contributed to poorer outcomes, from greater patient and staff anxiety to higher blood pressure, greater pain, and interrupted sleep—not to mention increased staff fatigue and turnover.

Based on their review of the evidence, the researchers made a number of recommendations, including (but not limited to) the following.²

- **Replace multiple-occupancy rooms with private rooms.** This is perhaps the one measure that can have the greatest impact on patient outcomes; it can reduce the rate of nosocomial infections, increase patients' privacy, reduce the number of transfers needed, reduce noise and allow patients to sleep better, and lessen stress in patients and their families. Although the cost up front of private rooms is higher, the researchers found that costs were lower in the long run, as a result of reductions in infection rates, readmissions, and transfers.
- **Design facilities that are "staff friendly."** The traditional nursing station tends to be hectic, making it easier for nurses to commit errors—when updating charts and filling medication orders, for example. A central nursing station makes it necessary for nurses and other staff members to trek down long hallways to reach their patients and supply rooms. A decentralized plan, however, consisting of several organized and well-lit spaces close to patient rooms, has been shown to be a highly beneficial alternative. A decrease in distractions and interruptions results in reductions in medication errors and stress, and this type of system allows nurses to spend more time in patient care and to respond more quickly to calls for assistance.
- **Increase access to natural light.** Numerous studies reported on the health benefits of access to natural light, and poor lighting also contributes to medication errors. Providing abundant natural light also helps cut energy costs.
- **Reduce noise.** Noise is a major source of stress for both patients and staff. Installing sound-absorbing ceiling tiles, eliminating or muffling noise sources (by switching to a silent paging system, for example), and putting in more single patient rooms are all effective strategies for reducing noise. In facilities that have taken steps to turn down the volume, patients have reported greater satisfaction with their care and better sleep, and they've been shown to have lower blood pressure. Levels of job satisfaction and the quality of sleep among staff members have also been seen to improve with reductions in noise.

The Pebble Project is a collaborative research effort between the Center for Health Design and selected health care providers. It's hoped that more facilities will consider evidence-based design when they decide to renovate or rebuild. Launched in 2000, the project now has 35 active provider partners, three corporate partners, and two "alumni."

Pebble Project partner Bronson Methodist Hospital in Kalamazoo, Michigan, used evidence-based design when the decision was made to replace their old facility. The new 343-bed hospital has private rooms for all patients with accommodations for family; state-of-the-art technology; a greater number of sinks to encourage frequent handwashing; a new ventilation system; and the creative use of artwork, music, light, and nature to create an aesthetically pleasing environment.

The switch from predominantly semiprivate rooms to private rooms only gave the hospital an opportunity to compare the rates of nosocomial infection before and after the opening of the building. According to an unpublished, in-house study, the overall rate of hospital-acquired infections declined by 11% after the building opened, despite a

higher occupancy rate and greater patient volumes.

Employee turnover has also dropped. Katie Harrelson, chief nursing executive, says there's a big difference. "In 2005 we had a 5% RN turnover," she says. "Before we opened the new facility, we were at 19% or 20%." Currently, Bronson has a waiting list of nurses who wish to work there.

Harrelson says that, right from the beginning, employees were involved in designing the new facility. "They told us where they wanted medication rooms, how they wanted patient rooms to be set up, which kinds of equipment would make their jobs easier, and so on. We had to become more service oriented and create a facility that would draw people to us."—*Roxanne Nelson, BSN, RN* †

REFERENCES

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