

## PeaceHealth's Sacred Heart Medical Center 'healthy by design'

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As the hospital industry undergoes an unprecedented building boom, a new discipline is changing the way architects design hospitals.

Called evidence-based design, it's based on the idea that how a hospital is designed can and does affect how a patient recovers from illness or surgery. It also has a direct bearing on the health and morale of nurses and other hospital staff members.



PeaceHealth's new RiverBend hospital incorporates design elements that research has found help patients recover faster.

Those principles are being put into practice in Springfield, where PeaceHealth's new RiverBend hospital is being built, and in Eugene, where McKenzie-Willamette Medical Center is trying to win approval for its new DeltaRidge hospital.

"We know a lot about how the physical environment affects patients," said Anjali Joseph, research director at the Center for Health Design in Concord, Calif. "Architects and designers can make informed decisions about how design is likely to affect patients and staff, and design places that are safer, less stressful and more satisfying places to work, and more healing places."

Many of the concepts of evidence-based design, while supported by research, also seem like common sense.

For example, patients do better in quiet, single-occupancy rooms with views of nature.

Perhaps the single biggest change in hospital design is the advent of single-bed rooms. Last year, the American Institute of Architects' Academy of Architecture for Health recommended single-patient rooms when it updated its hospital design guidelines.

The recommendation is based on research that suggests that not only do patients prefer single rooms, they also are less likely to develop infections, more likely to speak frankly with their doctors, are more likely to sleep better, and are less likely to get the wrong medications, according to a review of published research conducted by Roger Ulrich, a Texas A&M architecture professor, and colleagues at the Center for Health Design.

Family members also are able to provide more support for patients in single rooms.

Both PeaceHealth's Sacred Heart Medical Center at RiverBend and McKenzie-Willamette's proposed DeltaRidge hospital will have single-patient rooms.

Even the emergency department exam rooms at both hospitals will be private rooms, rather than curtained cubicles. That's because a 2001 study found that 5 percent of patients in an ER withheld parts of their medical history and refused parts of a physical exam because of privacy concerns. (A 1997 study found that 100 percent of doctors and nurses in a university hospital ER breached patient privacy.)

The new patient rooms also will include space for family members to relax, and will have hydraulic lift systems, to help get patients in and out of bed while sparing the backs of nurses.

While building a hospital based on evidence-based design may cost more upfront, those costs are quickly repaid by operational savings and increased revenue, and result in substantial financial benefit, according to a study published in the journal *Frontiers of Health Services Management*.

The researchers found that better design can reduce patient falls; patient transfers, which increase the risk for errors; hospital-acquired infections; nursing turnover; and increase market share and philanthropy.

One example of how an upfront investment can save money down the road is the installation of ceiling lifts over hospital beds. Such lifts reduce patient falls and save nurses' backs.

A study conducted by Lola Fritz, PeaceHealth's director of operational facilities planning, found the use of ceiling lifts virtually eliminated staff injuries from handling patients. Before ceiling lifts were installed, about five injuries occurred each year in both the intensive care unit and the neurology unit with a total annual cost of \$365,145.

After lifts were installed in the two units, the number of injuries in both units combined decreased to 2.8 per year, with an annual cost of \$61,845.

Fritz calculated the ceiling lifts installed at RiverBend at a cost of \$1.6 million will pay for themselves in 2 1/2 years.

### **Nature in view**

Another key principle of evidence-based design is that views of nature promote healing. The importance of views first came to light in a landmark study by Ulrich published in the journal *Science* in 1984.

Ulrich examined the medical records of 46 patients who had each undergone the same common type of gall bladder surgery at a suburban Pennsylvania hospital over a 10-year period. Half the patients had rooms with windows overlooking a small stand of deciduous trees, and half had rooms with windows facing a brown brick wall.

The study found that patients with the view of the trees left the hospital more quickly after surgery, received fewer negative evaluations from nurses and required fewer painkillers than the patients looking at a brick wall. More recent studies have confirmed that a natural view or time in a garden can do wonders for mental and physical health.

The design of RiverBend is meant to take advantage of the stunning views of the McKenzie River, Coburg Hills and the Willamette Valley, and nearby groves of towering firs, Fritz said. All patient rooms will have 6-foot by 8-foot windows, and the vast majority will feature views that take advantage of the natural beauty surrounding the hospital, Fritz said.

Hospitals also are examining specific materials, down to floor coverings, as they look for ways to improve the way hospitals are designed.

RiverBend will use carpet in its hallways, for example, instead of harder, easier-to-clean material, to help keep noise down, Fritz said.

A number of studies have found that higher noise levels in neonatal intensive care units decrease oxygen saturation. Other research has found that noise causes patients to wake up and sleep poorly. Noisy environments also have been found to increase stress in adults, heightening blood pressure and heart rate.

Noise also is stressful for nurses and other health providers. Quieter work environments have been shown to have a positive effect on staff members, including a reduction in perceived work demands, increased workplace social support, improved quality of care for patients and better speech intelligibility.

Carpet is harder to clean, although medical-grade carpet has built-in bacteria-fighting properties, Fritz said. But the main drawback to carpet is that it's harder to push gurneys, beds and wheelchairs, she said. Sacred Heart dealt with this by choosing flat, compact, tightly woven carpet, Fritz said.

Like other design changes, the use of carpet benefits hospital employees as well as patients, Fritz said.

Not only is carpet quieter, it looks nicer, and it's much easier to walk on - an important consideration for nurses and caregivers who log a lot of mileage during the course of a shift, Fritz said.

### **Adding green design to mix**

DeltaRidge is still in the planning stages, but it too will be designed to take advantage of the surrounding natural views, McKenzie-Willamette officials said.

Gould Turner Group, the Nashville architectural firm designing the hospital, "is very aware of the importance of outside views," said Rick Varnum, McKenzie-Willamette's associate administrator. "They get that the outside view is part of the healing process."

McKenzie-Willamette is proposing to build the hospital on the back nine of the RiverRidge Golf Course. Rooms will feature views of the golf course, surrounding trees and the Coburg Hills.

"It's very pastoral," said Linda Marzialo, president of Gould Turner Group. "A portion of the site will not be developed and remain green and in its current state." The hospital also will have a healing garden, where family members, staff and patients can relax, Marzialo said.

In addition to looking to evidence-based design, McKenzie-Willamette officials are striving to make their new hospital as green as possible. Green design and evidence-based design go hand in hand, Marzialo said.

McKenzie-Willamette is trying to win certification for Delta Ridge from Leadership in Energy Efficient Design, or LEED, a rating system of the U.S. Green Building Council. To become LEED-certified, the new hospital must be built with wide-ranging features that promote energy-efficiency.

To try to cut down on vehicle trips, the hospital will offer bicycle storage racks and changing rooms, preferred parking for fuel-efficient vehicles and a dedicated bus line, Marzialo said. Outdoor lighting will be controlled to reduce light pollution. During construction, contractors will use recycled and renewable materials where they can. For example, concrete stains and sealers will be made from soy beans. Wall rails inside the hospital will be made from corn plastics.

Energy-efficient design is not something that can be done at the last minute, Marzialo said.

It has to be designed into the project from the early stages and it requires that all the players - owners, architects, builders and engineers - buy into the program, she said.

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