How process-driven design helped Virtua optimize both the art and science of healing in its new hospital

New facility improves workflow efficiency, enables more patient-clinician interaction, and supports better outcomes

The new Virtua Voorhees hospital is both ahead of its time yet firmly anchored in the realities of healthcare delivery today—all by design.

Rather than erecting a new building to house the hospital’s existing processes and technologies, Virtua took the opportunity to re-think every aspect of patient care—present and future—well before beginning the design process.

“Traditionally, a facility is designed to be architecturally beautiful, and then you try to fit your processes into it. Unfortunately, it may not be operationally efficient,” says Tejas Gandhi, assistant vice president of management engineering and Lean at Virtua. “We wanted to take a different approach: to start by figuring out how we wanted our facility to function and then build the facility around those processes.”

The result is a 680,000-square-foot, 368-bed hospital designed specifically to transform the patient experience and ensure the best possible outcomes using next-generation technologies and processes.

The process-driven design efforts of Virtua were assisted by the Care Design practice of the GE Healthcare Performance Solutions group. “The tools and methods that GE provided set us on the road to a truly optimum facility design,” says Virtua Chief Executive Officer Richard P. Miller, FACHE.

“Our management engineering and Lean/Six Sigma teams then did a wonderful job of working with the architect to test the specific design concepts that led to the actual design of the hospital.”

DESIGNED WITH USER AND PATIENT INPUT

In addition to the Care Design team, the Virtua research-based design process involved architects, management engineers, information technologists, and multidisciplinary user groups. “We were careful to solicit input from our end users in designing the new operational processes. That’s something we learned from GE: If there is no buy-in, there is no ownership.”
You can design the greatest processes in the world, but if the people who run them don’t own them, you won’t get the results you want,” says Gandhi.

The planning process included a variety of methods:

**Site visit research** – The team identified and visited newly constructed “best practice” sites to gain insights for consideration during design.

**Photo journaling** – Staff members were given disposable cameras and binders and asked to document how well existing care environments supported clinical services. As part of the process, staff followed consenting patients through the care process and asked for their perceptions. This information helped drive various design decisions, such as providing separate pathways for support services and visitor flow, and designating specific places for family members to stay while waiting for patients.

**Current-state process mapping** – Virtua management engineers and the GE Healthcare team observed care processes at the existing Voorhees facility. They charted staff and patient travel distances and identified problems that needed addressing: excessive waits, long lines, unnecessary transfers, and under-used equipment. Spaghetti diagrams illustrated staff and patient movements and helped identify trips that did not add value. “A key consideration was freeing up staff time so clinicians could spend more time by the patient’s bedside,” says Mike Kotzen, vice president and chief operating officer of Virtua Voorhees. “Evidence shows that when that happens, clinical outcomes improve, patient satisfaction improves, and employee satisfaction improves.”

**Future-state operating models** – Virtua operations leaders researched future operating models and identified future processes that could affect space needs and layouts. Virtua also performed a technology assessment with help from the Sg2 health care analytics company. Technology road maps gave insights to how care will be delivered in the future and were used to define future patient and clinician flows. The architects then held “deep dive” sessions, where teams organized by patient type (pediatric, emergency, obstetric and others) worked to define ideal staff and patient flows. The process helped identify key components of the design, such as adjacencies, optimal entrances and exits, and connection points between inpatient and ambulatory services.

**Mock rooms** – Virtua built full-scale mock-ups of proposed room designs to enable clinicians and former patients and their families to walk through and share their feedback. This process provided critical input. For example, the hospital had originally planned to have sliding glass doors in most of the private neonatal intensive care rooms. “While parents appreciated our desire to optimize their privacy, they wanted to feel connected to the clinical staff. So we switched to curtains,” says Kotzen. Another example of the value of simulation was in ICU room layouts. “We held mock codes and quickly realized we needed to free up space around the beds for equipment. We wouldn’t have come up with that information any other way,” says Kotzen.

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SAVING MONEY BY GETTING IT RIGHT

In addition to driving world-class care, the process-driven design had financial benefits as well. The rigorous pre-build scrutiny and testing of the design enabled Virtua to reduce the number of user-driven change orders and accompanying cost escalation that are customary for a construction project of this size and scope, says Ninfa M. Saunders, RN, MSN, MBA, PhD, president and chief operating officer of Virtua.

“In a standard design-build, user-driven change orders usually account for 12% to 14% of the gross maximum price (GMP). In our case, that would have been $12 million in added costs. Because of our process-driven design approach, our change orders have been minimal—not even reaching the 1% level,” says Saunders.

Saunders says additional savings were realized by using Lean processes to determine the optimal adjacencies of the resources involved in delivering care—where service departments should be located, where equipment should be placed, how patient movement and clinician workflow should be orchestrated. “By leaning out our processes, we were able to save close to $7 million in terms of cost avoidance,” says Saunders.

The nation’s economic collapse hit just as Virtua was breaking ground on the new hospital. “We had to spend the first $120 million from our own cash because the financial market was in the worst possible position at that time,” says Saunders. When financing loosened up, Virtua was able to secure a bond at a highly attractive interest rate, in large part because of its track record for organizational excellence. “One analyst told us: ‘I would normally not buy a healthcare bond, but this one has all the right components—the feel, the look, the way it was planned, and how it’s being put together by a high-performing organization,” says Saunders.

THE WISDOM OF THE GROUP

The new facility reflects “the wisdom of the group,” says Gandhi. More than 300 members of the Virtua organization were directly involved in the design, from physicians and nurses to IT specialists and environmental services employees. “Our facility is not based on what a handful of people liked at a certain time or on feelings, emotions, or politics. The design is data-driven, based on what is right for patients and for clinicians, and it will stand the test the time,” Gandhi says.

“The hospital is coming to life in the way we envisioned it, and the pride is felt by all of our employees. They are seeing the difference this facility will make in the way we can care for patients,” says Kotzen.

“Virtua Voorhees embodies what our organization is all about; providing an outstanding patient experience,” says Saunders. “Over the years, GE has been instrumental in helping us develop the discipline, the tools, and the metrics and analytics needed to build a facility that enables the right care at the right place at the right cost.”

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