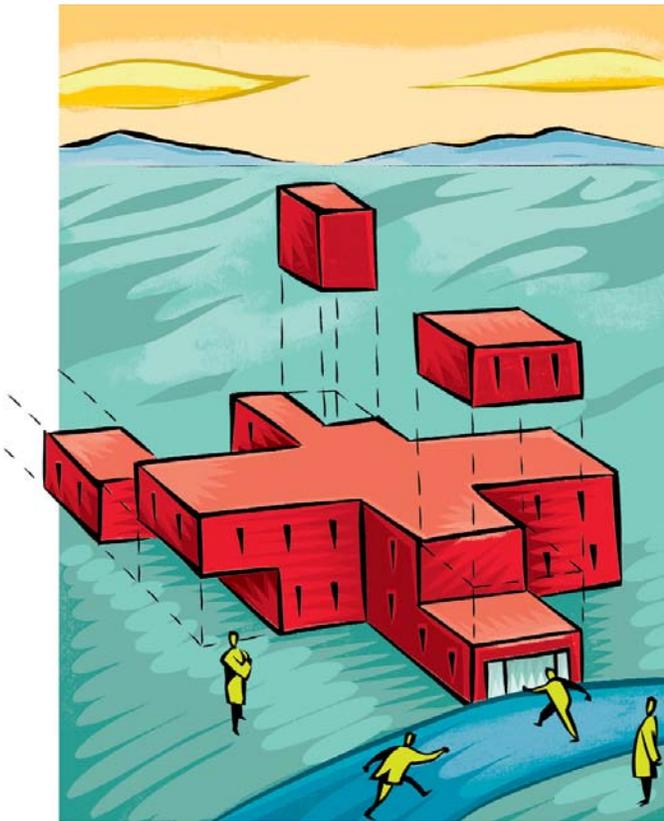


## Patterns of Care and Facility Design



Healthcare is in a state of change, no matter where its practitioners are located. One indication is the construction boom. In the U.K., for example, the National Health Service has 15 acute-care construction projects under way. Funded through the private finance initiative (PFI), they total over £3 billion.

In the U.S., completed construction projects in 2004 totaled \$22.6 billion, up from \$18 billion the year before.<sup>1</sup> Beyond the need to replace outdated facilities, shifts in where people are living, the aging of the baby-boom generation, and higher patient expectations for privacy and family-centered care will fuel the building trend for several more years. Healthcare analysts predict the U.S. will require 18 percent more acute-care beds by 2012.<sup>2</sup>

Whether the question surrounding these facilities is replacement or renovation, the answers involve both controlling costs and improving care. In fact, 61 percent of executives at hospitals and 79 percent at health systems say that improving operational efficiency and patient flow are major factors in their decisions about facilities.<sup>3</sup>

### Examining patterns of care

In anticipation of construction or, more immediately, to reduce costs, maintain margins, and improve quality, some healthcare organizations are adopting the techniques of lean manufacturing to identify the best patterns of care. As a result of aligning people with efficient processes and logical layouts, they are controlling costs even as they are improving patient outcomes.

The outcomes these organizations are achieving start with an examination of how they work. Workflow studies give staff members the opportunity to evaluate how they deliver care. These studies also help identify where and what improvements can be made to make the work process more efficient.

Studying workflow to increase efficiency isn't new to healthcare. Over 60 years ago, quality processes originally developed for manufacturing made a slow transition to healthcare. Total quality management (TQM), continuous quality improvement (CQI), and quality circles have all made an appearance.

By the late 1980s, quality initiatives waned in popularity, however, says Kenneth Kizer, president and CEO of the Washington-based



National Quality Forum. Their decline was “partly because of limited application and partly because of the technological transformation of American healthcare, the switch to prospective payment systems by Medicare and the rising cost of delivery—all of which made hospitals focus attention more on cutting costs and less on implementing team-based quality processes as a means to achieve those savings.”<sup>4</sup>

Increasing pressure from purchasers of healthcare services, including health plans, large employers, and government agencies, has rekindled interest. Many hospital boards have company executives who have seen the impact of Six Sigma, Lean Manufacturing, ISO 9000, and the Toyota Production System on their organizations. As a result, hospitals are paying consulting firms to help integrate the new processes.

Hospitals are making the investment because their costs—and the premiums charged to purchasers of healthcare services—keep rising. According to an annual employer health benefits survey, between spring of 2004 and spring of 2005, premiums for employer-sponsored health insurance rose by 9.2 percent. That was lower than the 11.2 percent increase in 2004 and the 13.9 percent increase in 2003. Even with this slight slowdown, however, premiums continued to increase much faster than overall inflation (3.5 percent) and wage gains (2.7 percent).<sup>5</sup>

A large part of the problem, say the consultants who are bringing lean principles to healthcare, is waste—anything that doesn’t add value. “The national numbers for waste in healthcare are between 30 and 40 percent,” says Cindy Jimmerson, a medical researcher with Lean Healthcare West. “But the reality of what we’ve observed doing minute-by-minute observation over the last three years is closer to 60 percent.”<sup>6</sup>

That’s a lot of waste, and one reason purchasers of healthcare services are considering new ways to pay providers. Pay-for-performance programs, for example, use incentives to encourage evidence-based practices that promote better outcomes and (ultimately) transform the healthcare system. Simply stated, they are an attempt to directly link reimbursement and quality.<sup>7</sup>

### Creating a lean culture in healthcare

In order for quality improvement initiatives to gain traction, however, consultants G. Landon Feazell and John Marren argue that healthcare

organizations must act more like businesses. “There are two formidable obstacles to hospitals moving...to the inevitable, optimal business model: (1) hospitals do not have the organizational structure to maximize and realize their potential as businesses; and (2) hospitals do not see the quality of their product, healthcare, as their fundamental business strategy.”<sup>8</sup>

To overcome these obstacles, some healthcare organizations are implementing a change in thinking at the strategic level. It’s a major undertaking, but without it efforts to improve the quality of care won’t produce the results required to satisfy the ultimate customer—the patient.

The idea behind “lean management” or “lean thinking” is to do only those things that add value for the customer. As with all other organizations, healthcare organizations are composed of a series of processes or sets of actions intended to create value for the customer. Lean initiatives determine the value of any given process by distinguishing value-added steps from non-value-added steps. Then, they eliminate waste so that ultimately every step adds value to the process.

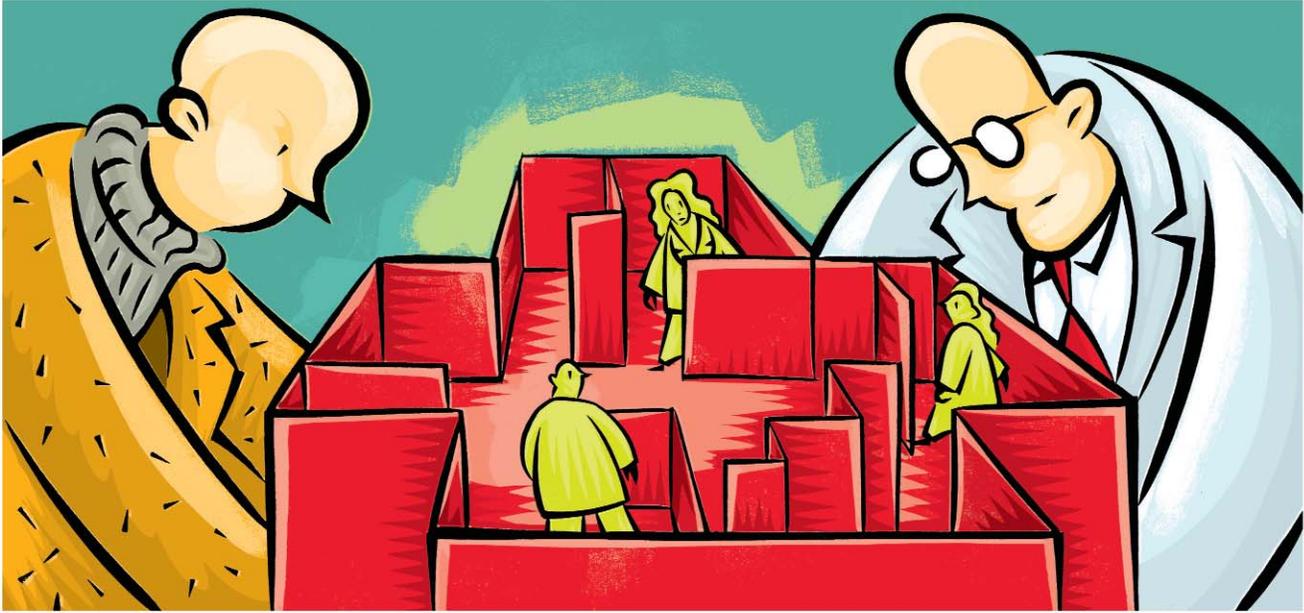
In the Toyota Production System (TPS), one of the leading approaches to lean, the goal for healthcare is the same as for any industry: Deliver to customers exactly what they need when they need it, every time, defect-free, in a safe environment at the lowest cost without waste.

### Improving efficiency and quality

In those organizations that instill and foster a lean culture, the results, by anyone’s definition of quality healthcare, are significant. And so are the cost savings.

Dr. John Long, a consultant with Lean Concepts, notes that lean thinking is so effective precisely because it inverts the accepted wisdom about improving care. “Most healthcare organizations cling to the belief that to improve quality you have to incur costs, you have to spend money to make improvements. Lean thinking involves a seeming paradox: Decrease lead-time and decrease labor content within that time and then you improve quality.”<sup>9</sup>

He and other lean experts note that the only sustainable process is one that participants believe in. The best way to create belief in a



process is for participants to be able to see it in its entirety and to understand its logic. The best way to create that understanding is to directly involve participants in improving the process.

Seemingly mundane changes have led to dramatic results. By devising one standard instrument tray for the 12 doctors performing laparoscopic gallbladder surgery, Virginia Mason Hospital in Seattle reduced the cost of the procedure by \$950. In the hospital's sleep disorders unit, three physicians now share one office, conducting 90 percent of their work in the exam room, according to medical director William J. DePaso. The space saved enabled Virginia Mason to create a business delivering sleep-assistance devices, generating about \$200,000 in profit in 2004.<sup>10</sup>

Staff at Utah Valley Regional Medical Center redesigned the neurological OR suite and simplified processes and procedures. As a result, they reduced turnover times from between 30 and 40 minutes to between 10 and 15 minutes.<sup>11</sup>

Lee Memorial Health System in Ft. Myers, Florida, gained \$5.3 million in 2004 through a combination of savings, cost avoidance, and increased revenue. One contributor was improved patient flow through the Emergency Department. With fewer backups, admission rates increased by 20 percent, which generated almost \$1 million in additional revenue, according to Atil Koyuncu, director of Continuous Improvement.<sup>12</sup>

Another Florida organization, DSI Laboratories, used lean and Six Sigma methodologies to eliminate waste and reduce variation in its hospital clinical laboratory. After mapping its processes and developing more efficient workflow, the lab realized savings of nearly \$500,000 by

- Reducing overtime spending by 60 percent (\$78,000) in the first year
- Reassigning six phlebotomists to open positions for an annual savings of \$160,000
- Requiring 4.5 fewer technologist positions for a savings of \$250,000<sup>13</sup>

ThedaCare, a health delivery system with three hospitals, 27 physician clinics, and a 300,000-member health plan based in northeast Wisconsin, recorded significant outcomes by involving everyone on staff in intensive process improvement efforts called Event Weeks.

By the end of 2004, about 600 employees had participated in the rapid-improvement sessions, and they helped the system achieve \$3.3 million in savings. They also reduced accounts receivable from 56 to 44 days equating to about \$12 million in cash flow. They halved the time it takes to complete clinical paperwork on admission. And their efforts freed up the equivalent of 33 full-time employees who were reassigned to other jobs in the system.<sup>14</sup>

### Influencing the design of facilities

What organizations learn about their patterns of care often results in immediate improvements. When feasible, that knowledge also affects the layout of their physical spaces. And it can influence the form future facilities take.

At Exempla Healthcare in Denver, Colorado, Dr. David Munch, vice president and chief clinical quality officer, has seen the close relationship between lean efforts and facility layout. "Upfront, we took the time to understand the current layout for the central pharmacy and a satellite pharmacy in our ED," he says. "Based on what we learned using time-motion and Spaghetti Diagram tools, we made wholesale layout changes, moving supplies and materials. We also developed J-shaped work areas that freed up 30 to 40 percent of the counter space for greater efficiency and better use. That would have been much easier with modular furnishings. We're scheduled to begin build out on the fifth and sixth floors of our tower, and we'll use lean tools and workflow analysis to assist in the design of those floors."<sup>15</sup>

Saint Mary's Health Care in Grand Rapids, Michigan, launched its lean initiative in June 2005. Already the information gained through lean efforts has had an impact on facility design. In one example, the Sterile Supply Department looked at equipment it was storing. "Sterile Supply had trays of instruments and other equipment that had not been used in years; they were labeled for use by physicians who no longer used them or no longer practiced at Saint Mary's," says Dr. John Collins, chief quality officer. "The staff in the department evaluated all the equipment to determine what was necessary and then identified a place for each item. This led to a redesign of how the work processes were configured and resulted in moving equipment racks and shelves into a different configuration."<sup>16</sup>



In nearby Muskegon, Michigan, Mercy General Health Partners is using lean thinking to change the way it equips its operating rooms. “A big part of lean is standardization,” says Mary Boyd, vice president of Business Development and Operational Excellence. “The problem was with supplies. We were using large carts to serve several cases. The result was low accountability, with over supply on some items and under supply on others. We’re replacing this with smaller, mobile exchange carts. Each suite has a cart packed with the cases for that day, and each has a companion cart in central supply that gets packed for the next day’s cases. As a result, we’ve significantly reduced turnover times between cases.”<sup>17</sup>

Indeed, maximum flexibility is a key enabler of lean initiatives, according to Dr. John Long of Lean Concepts. “A layout should assume nothing because work is always changing. You can do value-stream mapping, but you also have to understand that as people experiment with improving the processes and the workflow they are going to want to change things around. First you figure out the best way to do something, to create stability in the value stream, then you ask where to put things. It’s just like in manufacturing. You don’t put in a conveyor first and then figure out how you’re going to work.”<sup>18</sup>

Changes in the way healthcare is delivered are inevitable and happening faster all the time. This has led Jim Jonassen, managing partner at the architectural firm NBBJ and a researcher of healthcare delivery systems in the United States, Europe, and Asia, to advocate a flexible strategy for facilities. He proposes “a new way of thinking about zoning a building and separating the permanent from the changing (or temporal).”<sup>19</sup>

In Jonassen’s scheme, the permanent facility is an integrated, three-dimensional structure that links mechanical, electrical, signal, and logistic systems with horizontal and vertical people circulation. This multi-level “tube” of space would include a stand-alone servant building and the architecture for movement, encountering, and socialization.

For the temporal part of the system, Jonassen suggests an affordable architecture of change with uniform multi-level blocks of functional space and universal rooms configured to accommodate a range of uses. He recommends outfitting universal rooms with modular-movable and semi-movable casework. An effective flexibility strategy,

he believes, “should establish a long-term facility system that is reasonable in cost, responds to change over time and on many levels, maintains cost-effectiveness, and enables healing and green design.”<sup>20</sup>

In its effort to create designs that work for patients, staff, and families alike, Chicago-based architectural firm OWP/P shadows doctors and nurses as they give care and patients as they journey through a hospital and conducts role-playing workshops that confront the realities of caregiving. “While ‘shadowing’ reveals how people use existing hospitals, the learning labs and role playing spark designs that users might not even know they need,” notes a Fast Company article on the approach.<sup>21</sup>

As architects, administrators, and boards grapple with how to make facilities work better for patients, doctors, and staff, they will use what they learn from lean to shape hospital design. The consulting firm Accenture, in its recent review of issues confronting health executives, notes that high-performance organizations are incorporating these insights into an overall effort that will transform the health industry. Among other traits, these organizations share “a relentless focus on business insight, continuous performance improvement, and growth.”<sup>22</sup>

Planning for flexibility is one result of the careful analysis involved in a focus on continuous improvement. Using that knowledge, healthcare organizations can make better decisions about current and future facilities. As consultants with Bristol Group Mitretek note, “Good healthcare planning should involve an aggressive search for opportunities to consolidate similar functions and improve adjacencies of interdependent departments. A well-planned physical layout can reduce staff time that is now spent on non-value-adding activities.”<sup>23</sup>

Increasing value certainly requires greater efficiency in patterns of care and the physical layout of facilities. And focusing on all aspects of efficiency can certainly help caregivers provide more and better care.

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